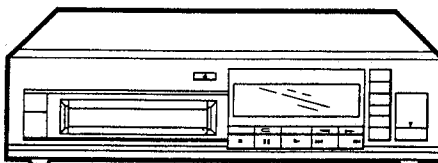


Service Manual



**ORDER NO.
ARP1481**

MULTI-PLAY COMPACT DISC PLAYER

PD-Z81M

MODEL PD-Z81M HAS THREE VERSIONS:

Type	Power requirement	Export destination
HEM	AC220V, 240V (switchable) *	European continent
HB	AC220V, 240V (switchable) *	United Kingdom
SD	AC110V, 120 ~ 127V, 220V, 240V (switchable)	Kingdom of Saudi Arabia and general market

* Change the connection wire from Power switch board assembly to Transformer board assembly.

- This service manual is applicable to the HEM, HB and SD types.
- As to the DISASSEMBLY, please refer to the PD-M50, PD-M40 and PD-M40-S service manual (ARP1342).
- As to the circuit and mechanism descriptions, please refer to the PD-M50, PD-M40 and PD-M40-S service manual (ARP1369).
- Ce manuel pour le service comprend les explications en français de réglage.
- Este manual de servicio trata del método ajuste escrito en español.

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PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 8E3 Canada
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PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL: [03] 580-9911

1. SAFETY INFORMATION

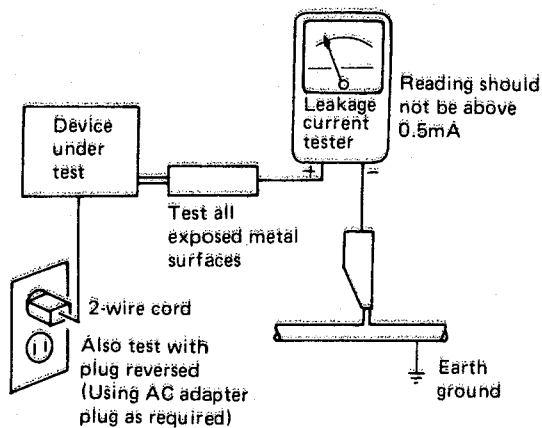
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

(FOR EUROPEAN MODEL ONLY)

VAROITUS!

LAITE SISÄLTÄÄ LASERDIODIN, JOKA LAHETTÄÄ NÄKYMÄTÖNTÄ, SILMILLE VAARALLISTA INFRAPUNASATEILYÄ LAITTEEN SISÄLLÄ ON LASERDIODIN LAHEISYYDESSÄ KUVAN 1. MUKAINEN VAROITUSMERKKI.



LASER
Kuva 1
Lasersäteilyn
varoituserkki

WARNING!

DEVICE INCLUDES LASER DIODE WHICH EMITS INVISIBLE INFRARED RADIATION WHICH IS DANGEROUS TO EYES. THERE IS A WARNING SIGN ACCORDING TO PICTURE 1 INSIDE THE DEVICE CLOSE TO THE LASER DIODE.



LASER
Picture 1
Warning sign for
laser radiation

ADVERSEL:

USYNLIG LASERSTRÅLING VED ÅBNING NÅR SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION UNDGA UDSÆTTELSE FOR STRÅLING.

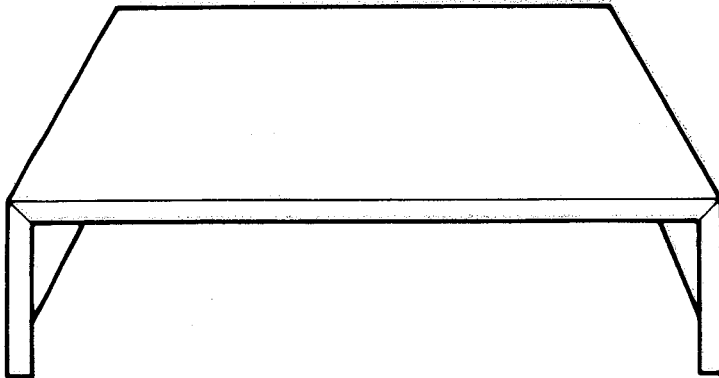
VÄR TIGT

APARATEN INNEHÅLLER LASER AV HÖGRE KLASS ÄN 1. INGREPP I APPARATEN BÖR GÖRAS AV SPECIELLT UTBILDAD PERSONAL.

IMPORTANT

PIONEER COMPACT DISC PLAYER APPARATUS CONTAINS LASER OF HIGHER CLASS THAN 1. SERVICING OPERATION OF THE APPARATUS SHOULD BE DONE BY A SPECIALLY INSTRUCTED PERSON.

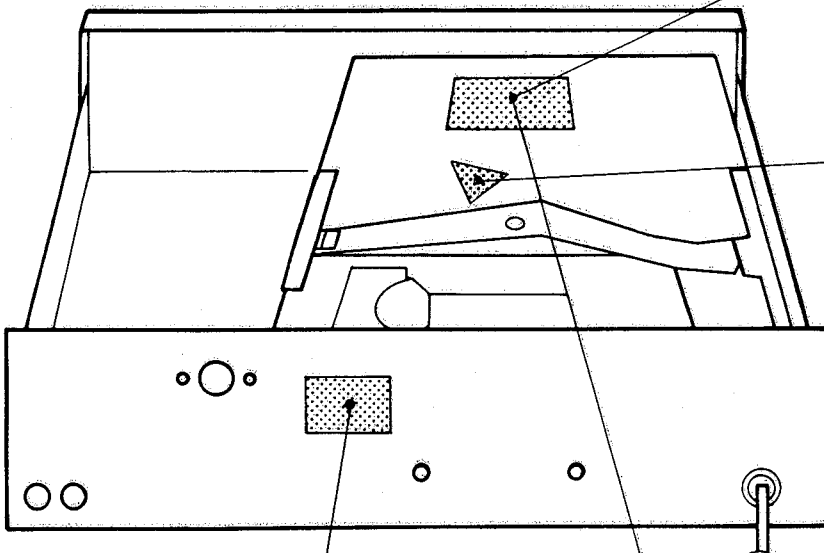
LABEL CHECK



HEM model

CAUTION
LASER RADIATION WHEN OPEN. AVOID EXPOSURE TO BEAM
ADVARSEL
FARE FOR USYNLIG LASERSTRÅLING VED ÅBNING AF DÆKSEL.
UNDGÅ AT UDSÆTTE ØJENE FOR STRÅLING.
VORSICHT!
UNSIICHTBARE LASER-STRÄHLUNG TRIT AUS, WEHN DECKEL
(ODER KLAPPE) GEÖFFNET IST! NICHT DEM STRAHL AUSSETZEN!
PRW-175

HEM and HB models



HEM and HB models

CLASS 1
LASER PRODUCT
VRW-328

HB model

CAUTION
INVISIBLE LASER
RADIATION WHEN OPEN,
AVOID EXPOSURE
TO BEAM
PRW1018

Additional Laser Caution

1. ON/OFF (L/H) MODE OF THE LOADING STATE DETECTION SWITCHES, LPS1 (S701) AND LPS2 (S702), ARE DETECTED WITH THE SYSTEM MICROCOMPUTER. LASER DIODE DOESN'T OSCILLATES UNLESS THESE SWITCHES ARE BOTH ON (L), THAT IS CLAMPED STATE. CONSEQUENTLY, IF THESE SWITCHES ARE SHORT-CIRCUITED ON PURPOSE, THE INTERLOCK IS INVALID. WHEN PINS ④, ⑤ OR ⑥ OF CXA1081S (IC1) IS SHORT-CIRCUITED TO GND, OR BETWEEN RESPECTIVE PINS OF Q1 ARE SHORT-CIRCUITED (FAULT CONDITION), THE LASER DIODE KEEPS OSCILLATING.
IN TEST MODE (REFER TO PAGE 28.), THE INTERLOCK MECHANISM DOESN'T OPERATE.
2. AT THE STATE WHICH BONNET IS OPENED, SERVO MECHANISM IS REMOVED AND IT IS TURNED OVER, IF IT IS FAULT CONDITION AND TEST MODE AS DESCRIBED IN ITEM 1, THERE IS THE DANGER TO BE CAUGHT LASER BEAM MORE THAN CLASS 1.

2. SPECIFICATIONS

1. General

Type Compact disc digital audio system
 Usable discs Compact Disc
 Signal format Sampling frequency: 44.1 kHz
 Sampling bit number: 16 bit linear

Power requirements

European models AC 220 V, 50/60 Hz
 U.K. models AC 240 V, 50/60 Hz
 U.S., Canadian models AC 120 V, 60 Hz
 Other models AC110/120 – 127/220/240V
 (Switchable) 50/60 Hz

Power consumption

European and U.K. models 11 W
 Other models 11 W

Operating temperature +5°C – +35°C

Weight 4.6 kg (10 lb 2 oz)

External dimensions . 360(W) × 318(D) × 85(H) mm
 14-3/16(W) × 12-1/2(D) × 3-11/32(H) in.

2. Audio section

Frequency response 4 Hz – 20 kHz ± 1.0 dB (EIAJ)

Signal-to-noise ratio 98 dB or more (EIAJ)

Channel separation 95 dB or more (EIAJ)

Output voltage 2.0 V ± 0.5 V (EIAJ)

Wow and flutter .. less than ±0.001% (W. PEAK)
 (below measurable level) (EIAJ)

Channels 2-channel (stereo)

3. Output Terminal

Audio line output

4. Functions

Number of discs to be stored — maximum 6.

Basic operation keys

- PLAY, PAUSE, STOP/CLEAR

Search function

- Disc selection (6 keys)
- Manual search
- Track search

Programming

- Maximum 32 steps
- Pause
- Direct programming
- Program clear

Repeat functions

- All discs repeat
- Program repeat
- 1 disc repeat (with program)
- Track repeat (with program)

Random Play

- Random play

Switching display

- Time consumed, remaining time, and total time

5. Display

FL tube display

- Passing time display (min, sec)
- Remaining time display (one track)
- Total time display (one disc)
- Disc number, track number
- Program step number
- Program indicator
- Repeat indicator
- Random play indicator
- Play indicator
- Pause indicator

6. Accessories

- Six-compact-disc magazine 1
- Control cord 1
- Output cable 1
- Operating instructions 1

NOTE:

Specifications and design subject to possible modification without notice, due to improvements.

3. PANEL FACILITIES

FRONT PANEL

POWER switch

Press to turn power to the unit ON and OFF.

EJECT key

Press to eject a magazine. When pressed, any magazine inside is expelled forward.

Magazine insertion slot

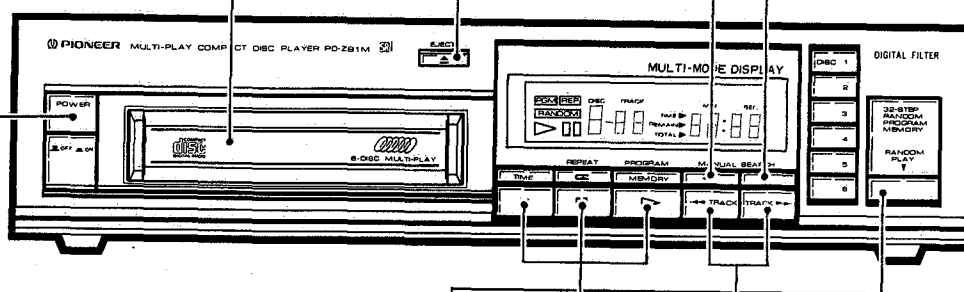
MANUAL SEARCH keys

When the player is in play or pause modes, these keys are pressed to perform fast forward or fast backward operations, to allow manual searching. These operations are done only during the time either key is pressed.

[▶▶] : Fast forward operation (If fast forward operation is performed to the end of the disc, "End" will be indicated and the player will enter the pause mode.)

[◀◀] : Fast backward operation (If fast backward operation is performed to the beginning of the disc, the player will enter play mode.)

If these operations are performed during programmed play mode, the player will enter the pause mode (or play mode), just before transferring to the next (or previous) step.



RANDOM PLAY key

Press to begin random playback.

PLAY key (▶).

Press to begin playback, and to release the player from the pause mode.

PAUSE key (⏸).

Press to temporarily interrupt playback. When pressed again, the player is released from the pause mode.

STOP/CLEAR key (⏹).

Press to stop playback. When pressed, the player goes into stop mode and all operations stop. Press to clear a program. When pressed during stop mode, the program stored in memory is cleared.

TRACK SEARCH keys

When the player is in the normal play, programmed play or pause modes, these keys are pressed to search for a desired track. The player can advance to the beginning of the next track on the disc or program or back track to the beginning of the current or previous track.

[▶] : When pressed once, play restarts at the beginning of the next track on the disc; when pressed continuously, the disc playback shifts to the beginning of succeeding tracks on the disc. (During programmed playback, it moves to the beginning of the next programmed track.)

[◀] : When pressed once, the disc playback returns to the beginning of the currently playing track; when pressed continuously, the disc playback shifts to the beginning of previous tracks on the disc. (During programmed playback it returns to the beginning of the previously programmed track.)

INDICATORS

- PGM** : Lights after programming (after program has been memorized).
- RANDOM** : Lights during random playing.
- REP** : Lights during repeat play.
- DISC** : Indicates disc number (1 - 6) during play or search.
- TRACK** : Indicates track number (01 - 99) during play or search.

TIME/REMAIN/TOTAL

Press TIME key for switching.

TIME: Indicates playing time (min/sec)

REMAIN: Indicates the time remaining on the track being played.

TOTAL: Indicates total playing time (min/sec).

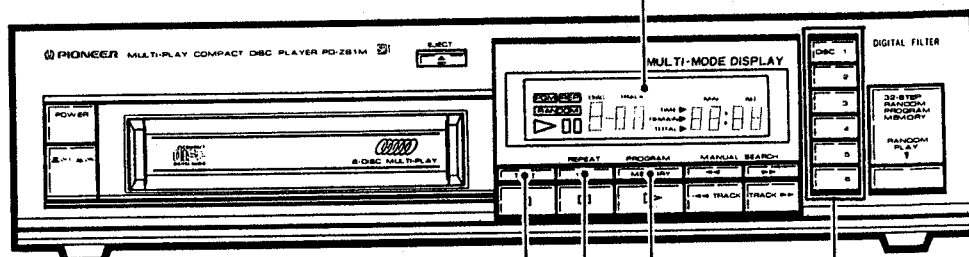
When programming, the total number of steps are indicated.

MIN: Playing or remaining time for the track indicated in minute.

SEC: Playing or remaining time for the track indicated in second.

PLAY (▷) : Lights during playback.

PAUSE (⏏) : Lights during pause mode, when playback is temporarily interrupted.



TIME key

- Use to select the method for displaying the playing time on the indicator panel. Each time the key is pressed, the indication changes from TIME, and REMAIN (track remain) to TOTAL in that order. (For details concerning the display contents, refer to the explanation about the indicators.)

DISC No. keys (DISC number 1 - 6)

Use to select disc numbers for playback or programming.

PROGRAM MEMORY key

Use to program a sequence of tracks.

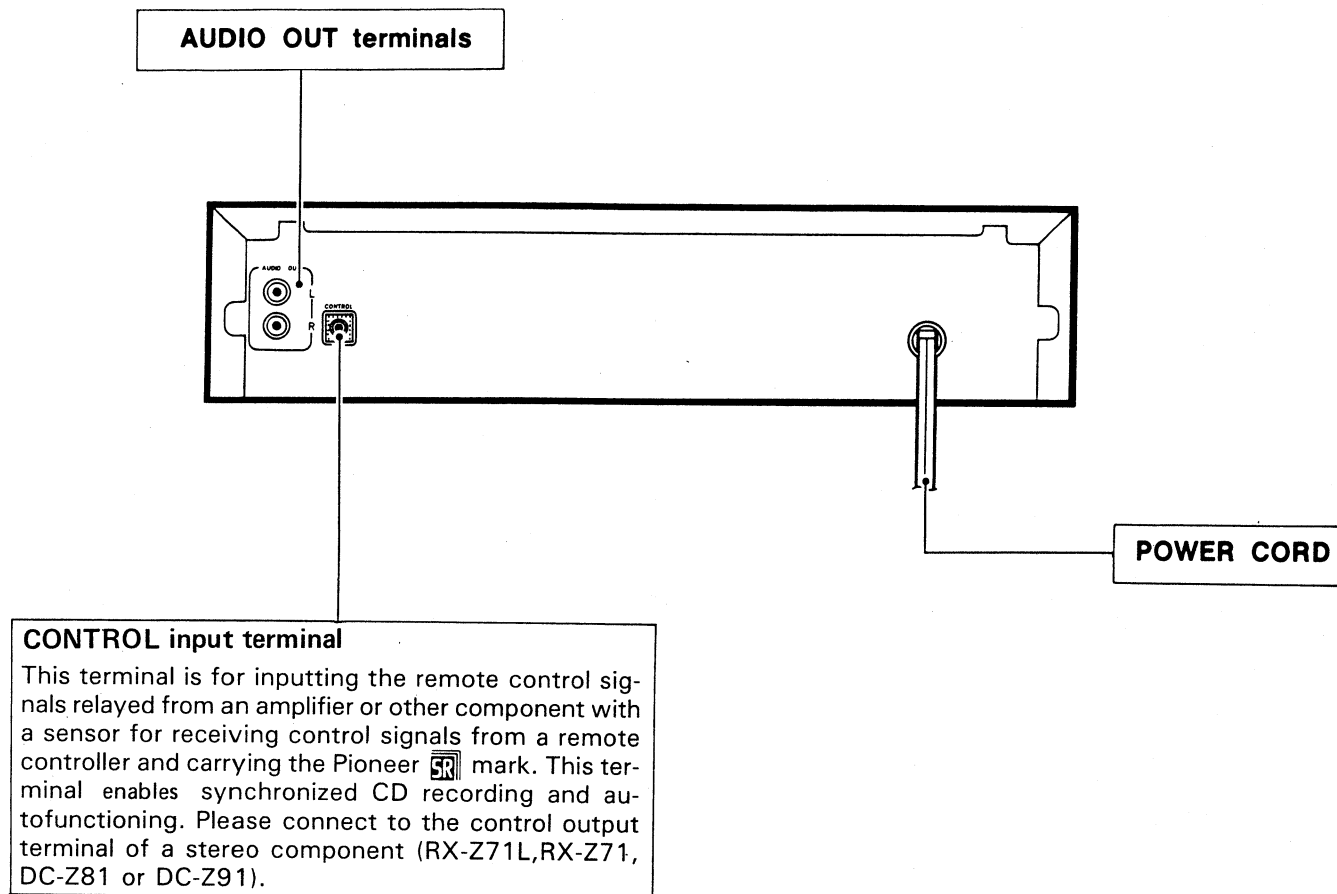
- Press this key after selecting a desired disc and track with disc and TRACK search keys. Tunes will be added to the program in the order in which they are specified.
- If only a DISC No. key is pressed, all tracks on the specified disc will be added to the program. The letters AL will appear on the indicator.

REPEAT key (⏮)

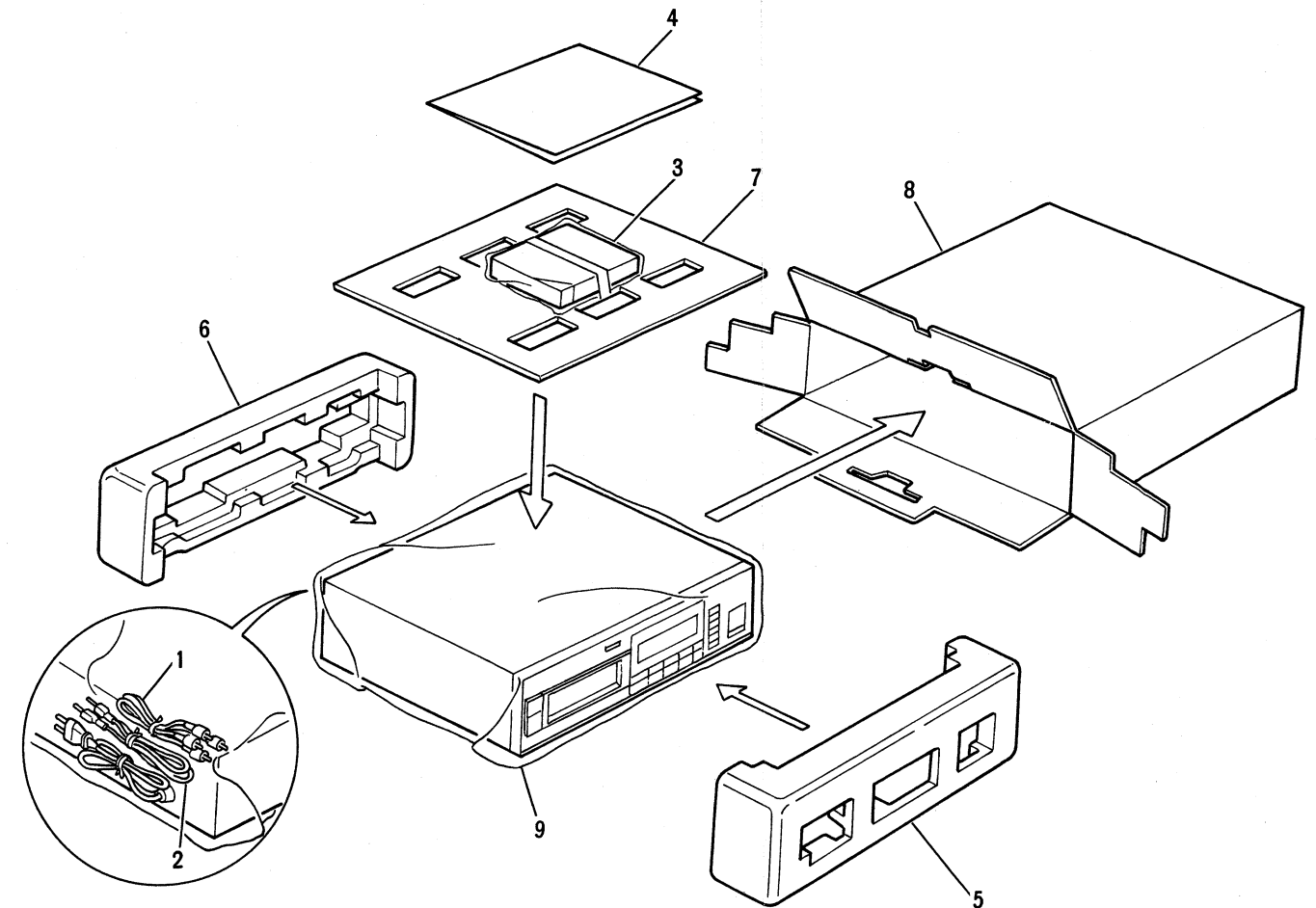
Press to perform repeat playback.

- If pressed during normal playback mode, all tracks on the inserted disc will be played back repeatedly.
- If pressed during programmed playback, the programmed tracks will be repeatedly played back in the programmed order.
- In the case of random play mode, after all the tracks have been played, random play will start again.

REAR PANEL



4. PACKING



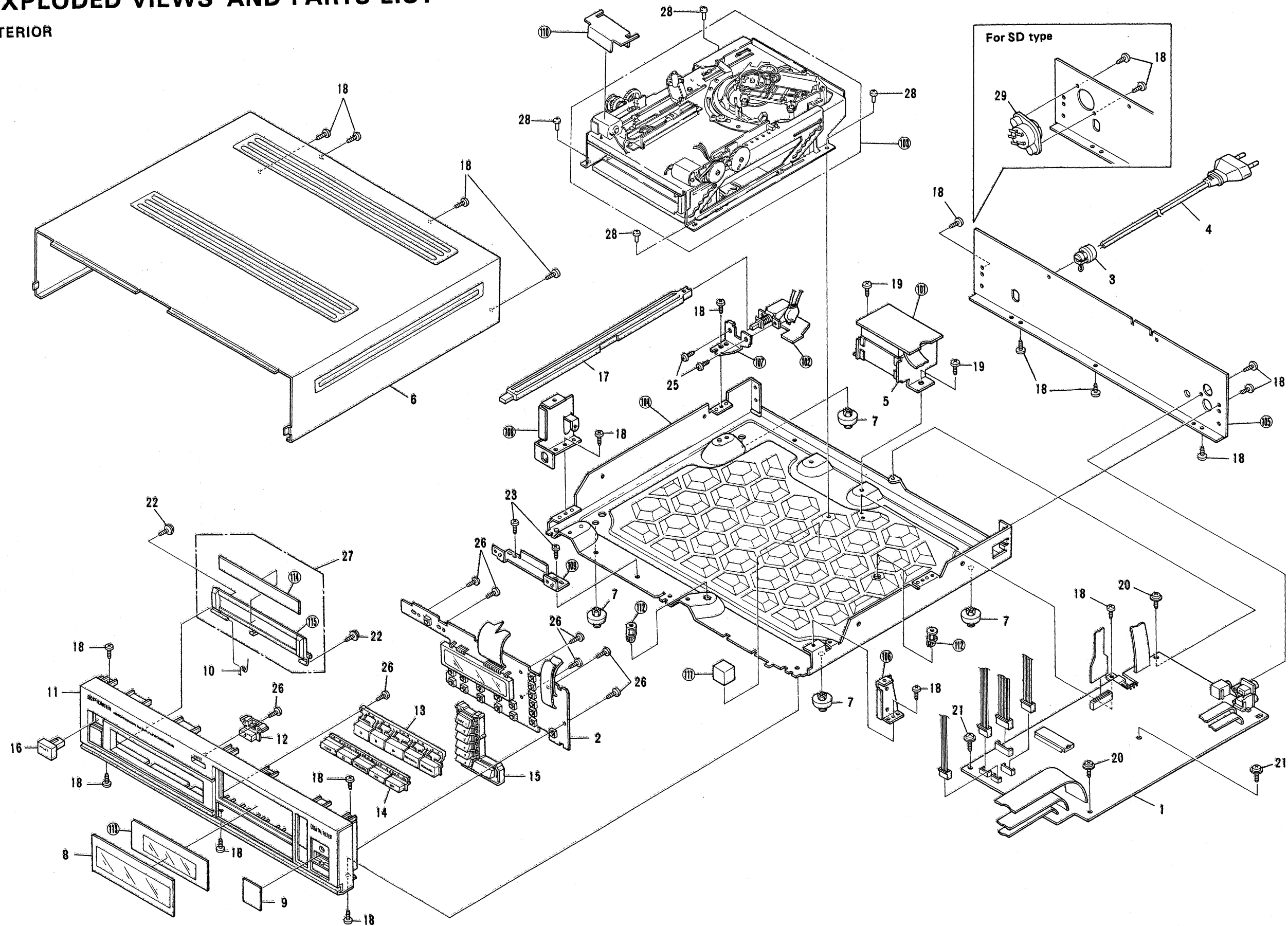
Parts List of Packing

Mark	No.	Part No.	Description
	1.	PDE1023	Connection cord with pin plug
	2.	PDE-319	Connection cord with mini plug
	3.	PXA1102	Magazine assembly
	4.	PRE1042	Operating instructions
	5.	PHA1051	Protector (F)
	6.	PHA1052	Protector (R)
	7.	PHC1008	Accessory holder
	8.	PHG1168	CD packing case
	9.	Z23-007	Mirror mat

PD-Z81M

5. EXPLODED VIEWS AND PARTS LIST

5.1 EXTERIOR



5.2 MECHANISM SECTION

Parts List of Mechanism Section

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
★★	1.	PEB1015	Belt		51.	CGDYX104M25	Ceramic capacitor
	2.	PNB1028	Stair (L)		52.	PBA-209	Screw
	3.	PNB1029	Stair (R)		53.	PBH1008	Drive spring
	4.	PNW1095	Gear pulley		54.	PBK1010	Spring
	5.	PNW1096	Gear	★★	55.	PEB1012	Belt
	6.	PNW1097	Gear		56.	PLA1003	Drive screw
	7.	PNW1122	Gear		57.	PLA1004	Guide bar
	8.	PNW1098	Idler gear		58.	PNW1062	Chassis
	9.	PBH-465	Eject spring		59.	PNW1063	Carriage plate
	10.	PBH1014	Lock spring		60.	PNW1066	Pully
	11.	PBH1015	SM spring	★★	61.	PSH1003	Slide switch (INSIDE)
	12.	PBH1018	Stair spring	★★	62.	PXM1009	Spindle motor
	13.	PBK1009	Drive spring		63.	PWY1003	Pick up assembly
	14.	PBP-001	Steel ball φ4		64.	BPZ20P080FZK	Screw
	15.	PNW1099	Rack		65.	PMZ20P030FMC	Screw
	16.	PNW1253	Drive plate		101.		Main chassis
	17.	PNW1101	Operation plate		102.		Gear angle (L)
	18.	PNW1102	Top guide		103.		Gear angle (R)
	19.	PNW1104	Lock lever		104.		Lever
	20.	PNY-386	Roller		105.		SM select
	21.	PXC-016	Damper assembly		106.		Eject lever
	22.	PBA-125	Screw		107.		Drive lever
	23.	PBA1002	Screw		108.		Bottom guide
	24.	PBH1016	Clamper spring (T)		109.		Sub chassis
	25.	PBH1017	Clamper spring (B)		110.		Upper chassis
	26.	PEB1014	Float rubber		111.		Upper guide
	27.	PED1001	Cushion (A)		112.		Switch board assembly
	28.	PED1002	Cushion (B)		113.		Select board assembly
	29.	PNW1068	Clamper		114.		Base plate
	30.	PNW1105	Rotary lever		115.		Carriage motor board
	31.	PNW1106	Clamper cam		116.		Servo mechanism assembly
	32.	PNW1107	Clamper holder (T)		117.		Roller
★★	33.	PYY1025	Motor assembly (CARRIAGE, LOADING, DISC SELECT)				
	34.	PNW1108	Clamper holder (B)				
	35.	PNW1110	Pressure cam				
	36.	PNW1111	Upper tray				
	37.	PYY1027	Disc table assembly				
	38.	BBZ20P080FMC	Screw				
	39.	.....	.....				
	40.	BBZ30P060FMC	Screw				
	41.	PCZ30P040FMC	Screw				
	42.	PEC-107	Binder				
	43.	PMZ20P030FMC	Screw				
	44.	PPZ30P080FMC	Screw				
	45.	WA30F120M100	Washer				
	46.	WA31D054D050	Washer				
	47.	WT12D032D025	Washer				
	48.	WT25D047D025	Washer				
	49.	WT31D054D025	Washer				
	50.	.....	.....				

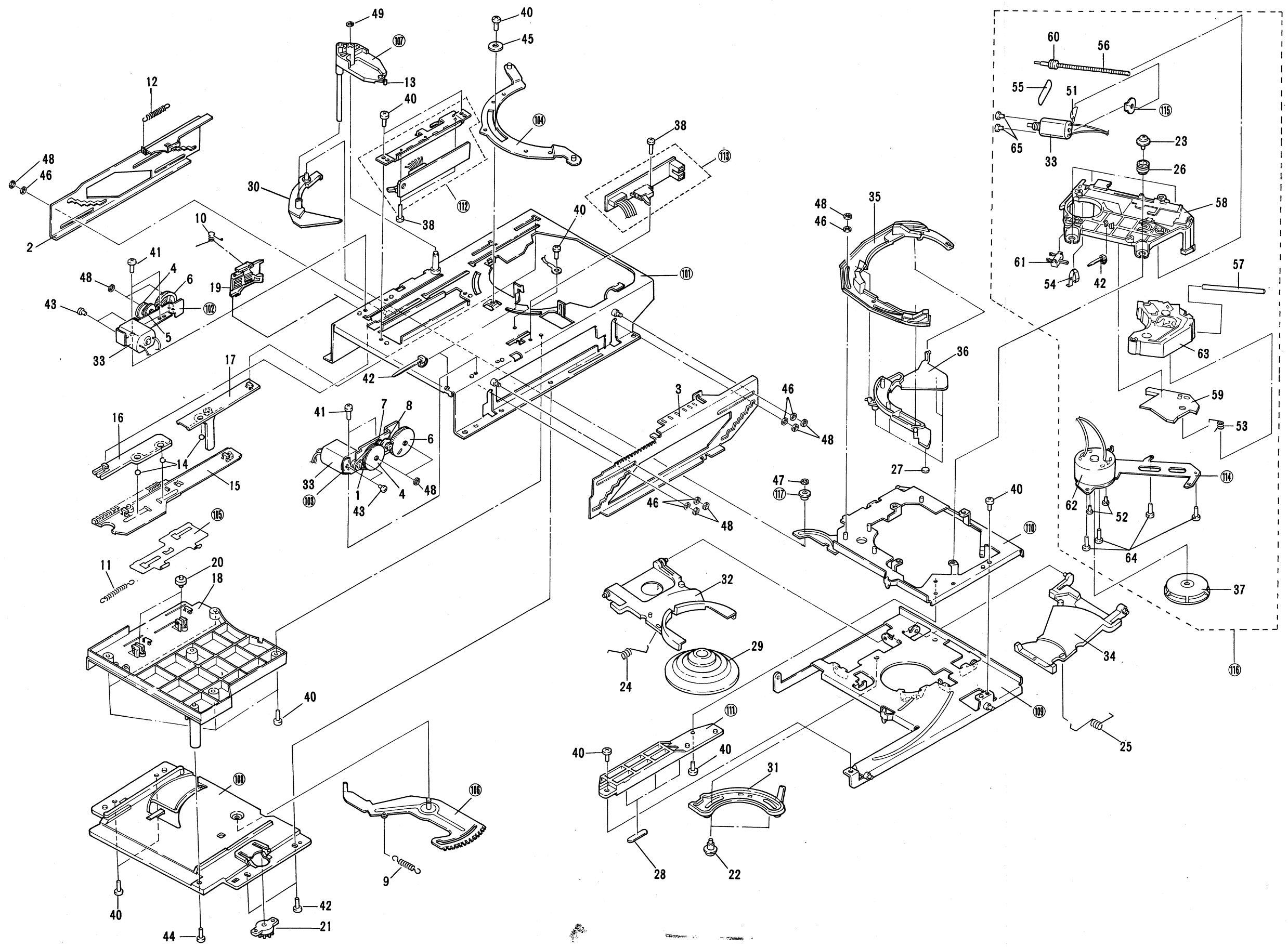
NOTES:

- Parts without part number cannot be supplied.
- The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★ GENERALLY MOVES FASTER THAN ★
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

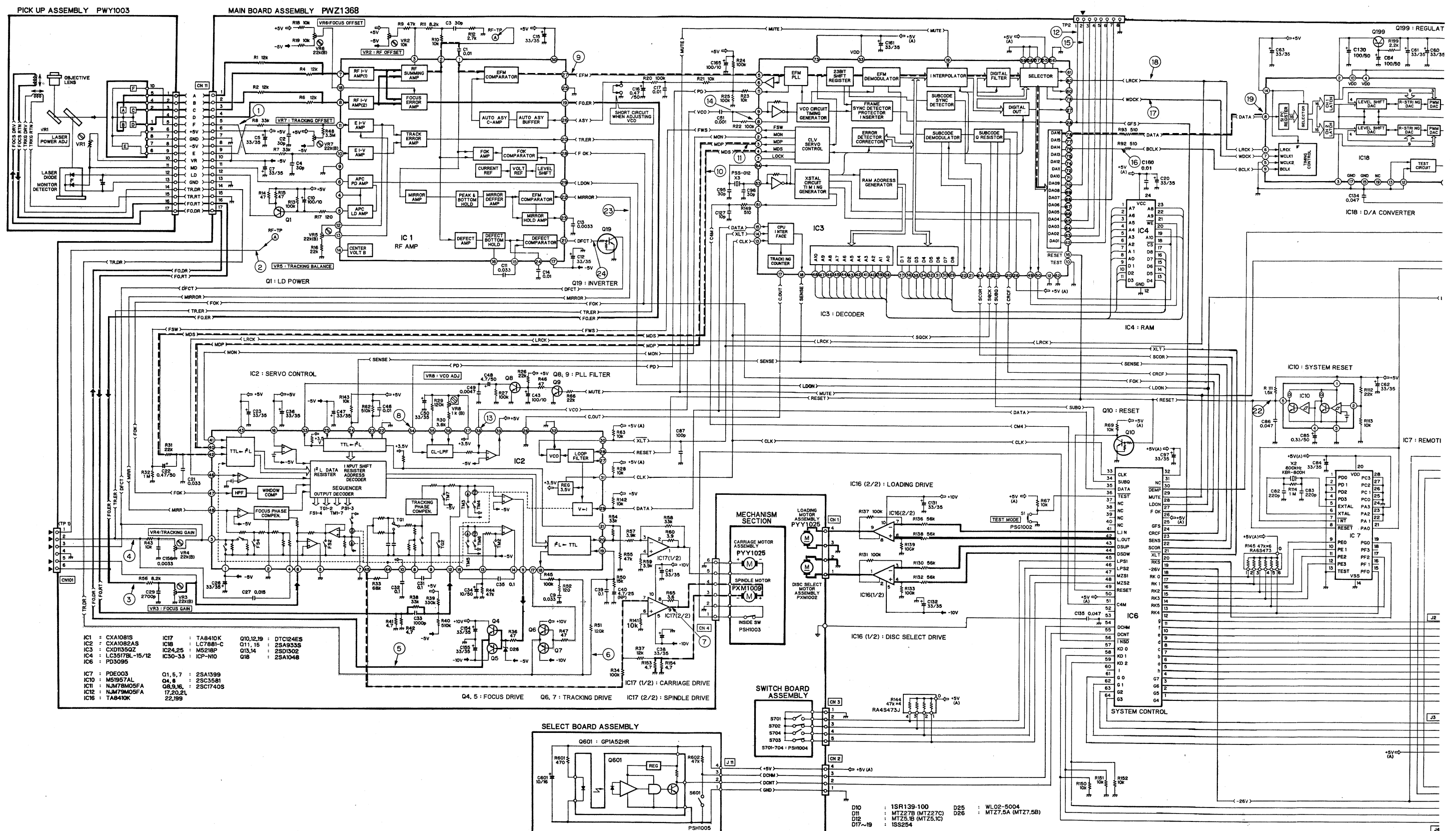
Parts List of Exterior

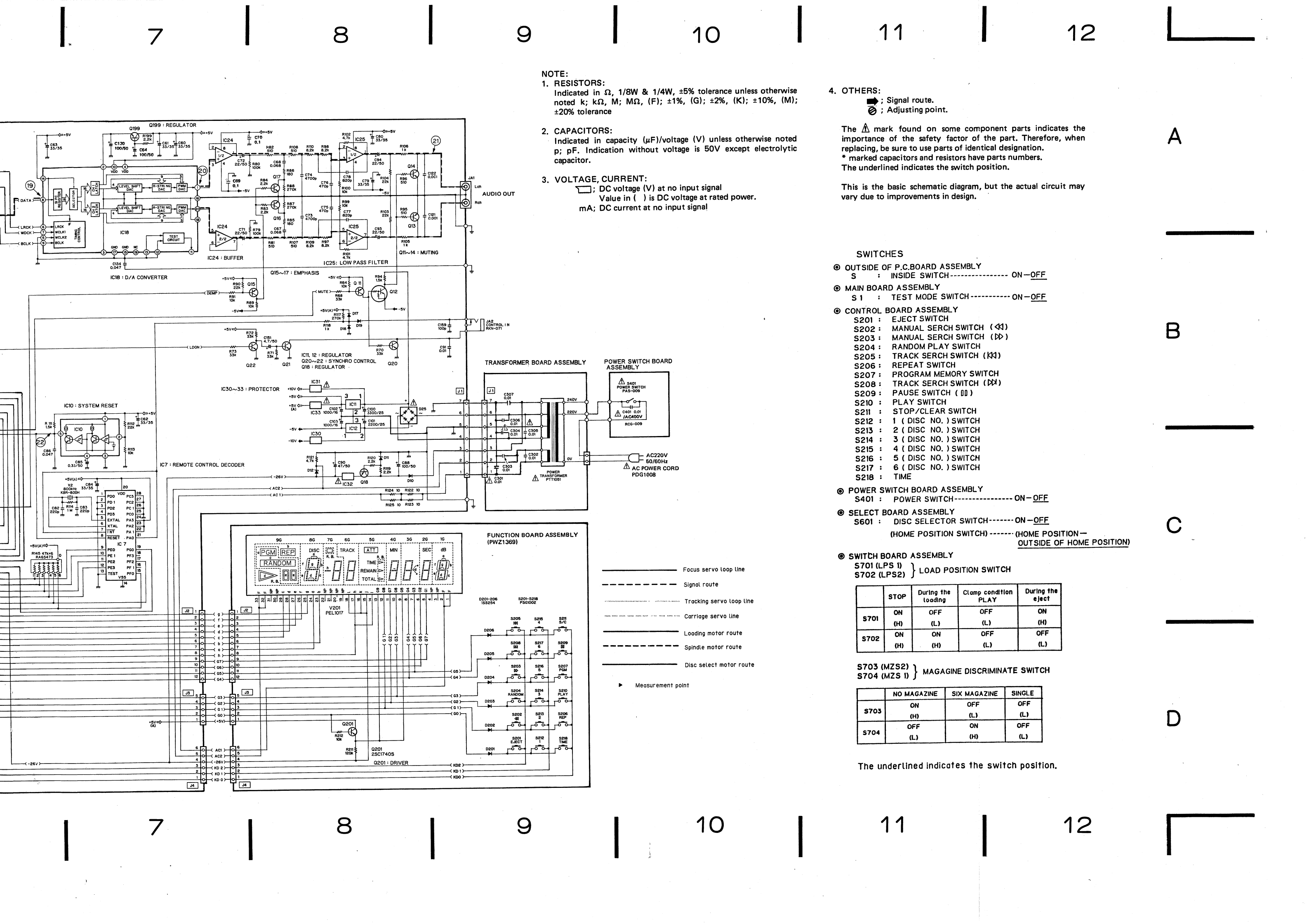
Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
⚠	1.	PWZ1368	Main board assembly		101.		Transformer board assembly
⚠	2.	PWZ1369	Function board assembly		102.		Power switch board assembly
⚠	3.	CM-22B	Strain relief		103.		Multi mechanism assembly
⚠	4.	PDG1008	AC power cord		104.		Base
⚠	5.	PTT1051	Power transformer (AC220/240V)		105.		Rear panel
	6.	PYY1054	Bonnet		106.		Angle
	7.	REC-434	Leg assembly		107.		Switch angle
	8.	PAM1212	Window		108.		Front angle (A)
	9.	PAM1165	Name plate		109.		Angle (P)
	10.	PBH1022	Door spring		110.		Shield plate (M)
	11.	PNW1333	Function panel		111.		Cushion
	12.	PAC1149	Eject button		112.		PCB spacer
	13.	PAC1237	Function button		113.		FL filter
	14.	PAC1238	Mode button		114.		Door name plate
	15.	PAC1239	Disc button		115.		Door
	16.	PAC1240	Power button				
	17.	PNY-528	Power SW joint				
	18.	BBZ30P080FZK	Screw				
	19.	BBZ40P060FMC	Screw				
	20.	IBZ30P060FCC	Screw				
	21.	IBZ30P150FCU	Screw				
	22.	IPZ30P060FMC	Screw				
	23.	PCZ30P050FZK	Screw				
	24.	PEC-107	Binder				
	25.	PMZ30P060FMC	Screw				
	26.	PPZ30P100FMC	Screw				
	27.	PYY1055	Door assembly				
	28.	BBZ30P060FMC	Screw				
⚠	★★ 29.	PSB1002	Line voltage selector (110, 120-127, 220, 240V) (SD Type only)				

iption
 mic capacitor
 w
 e spring
 ng
 e screw
 e bar
 is
 age plate
 switch (INSIDE)
 dle motor
 up assembly
 w
 w
 chassis
 angle (L)
 angle (R)
 or
 elect
 t lever
 e lever
 om guide
 chassis
 er chassis
 er guide
 ch board assembly
 ct board assembly
 plate
 iage motor board
 o mechanism assembly
 er



6. SCHEMATIC DIAGRAM





7. P.C. BOARDS CONNECTION DIAGRAM

MAIN BOARD ASSEMBLY (PWZ1368)

SWITCH BORD
ASSEMBLY

SELECT BORD
ASSEMBLY

FUNCTION BOARD ASSEMBLY (PWZ1369)

MECHANISM SECTION

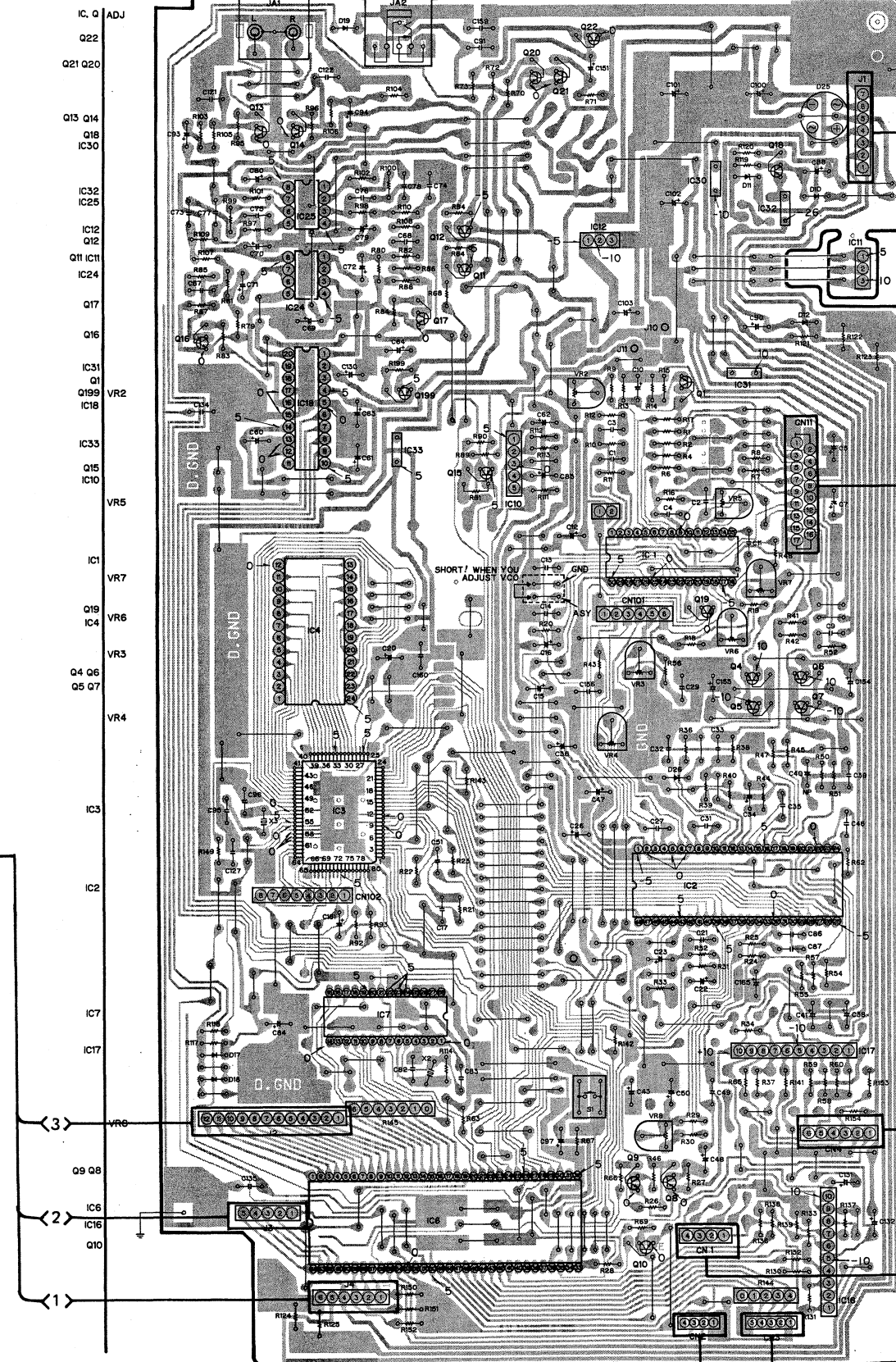
S 101
INSIDE SWI

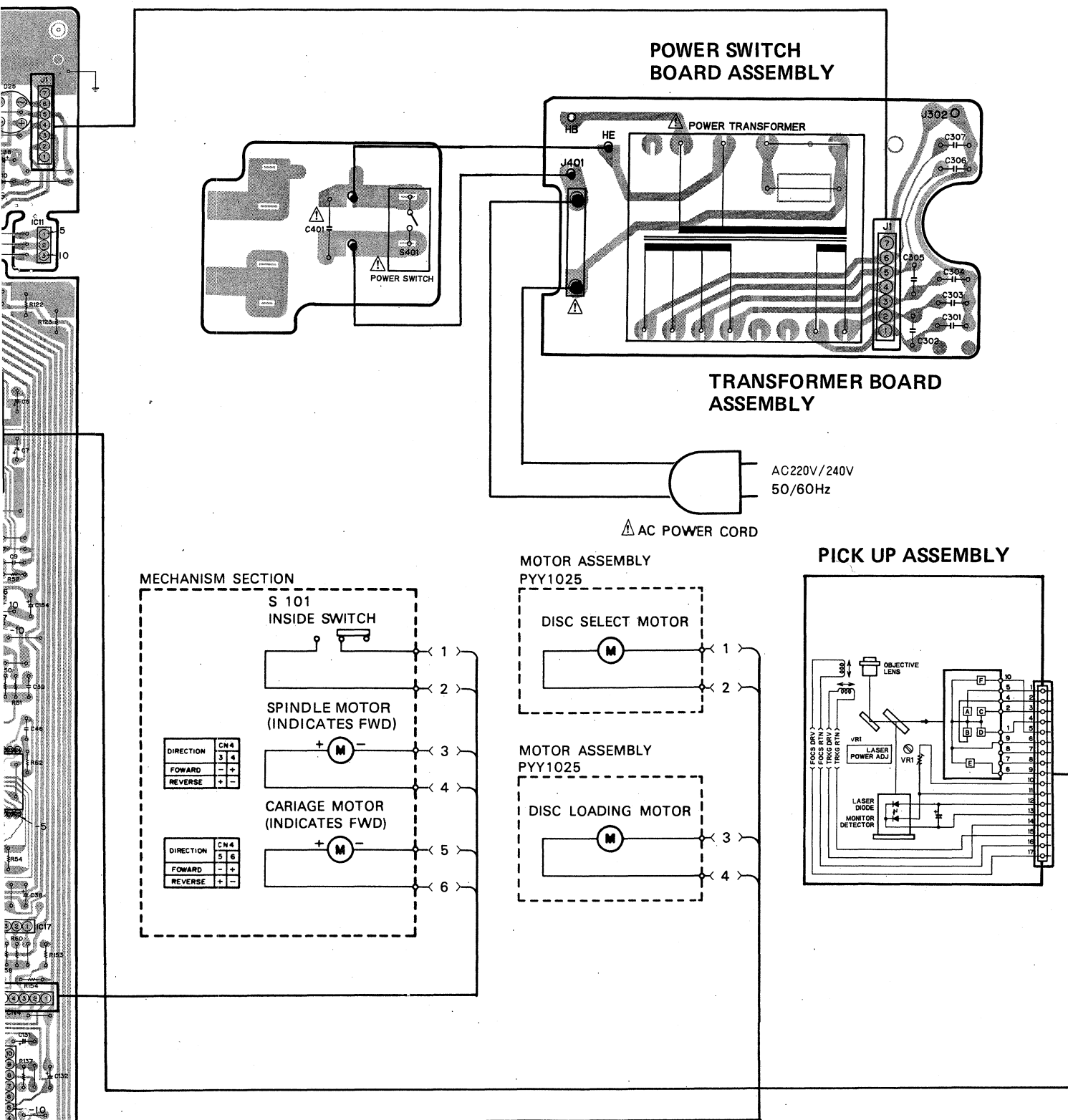
SPINDLE M
(INDICATE

DIRECTION	CN4
FORWARD	- +
REVERSE	+ -

CARIAGE M
(INDICATES

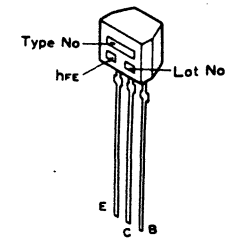
DIRECTION	CN4
FORWARD	- +
REVERSE	+ -



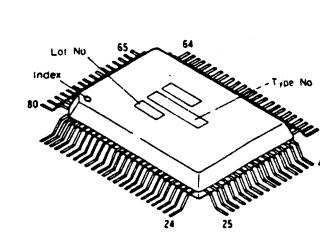


External Appearance of Transistors and ICs

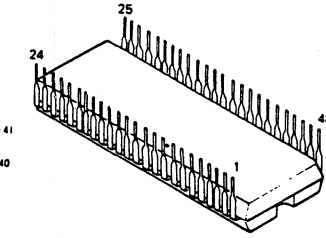
2SA1048



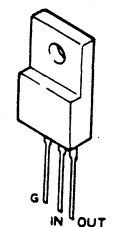
CXD1135QZ



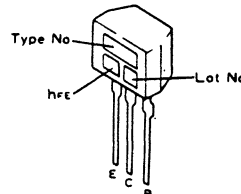
CXA1082AS



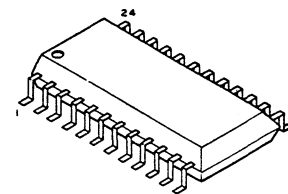
NJM79M05FA



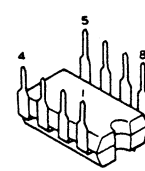
2SA933S
2SC1740S



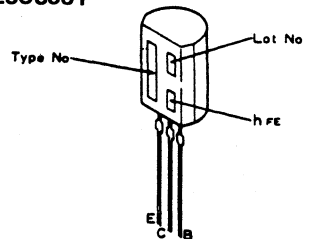
LC3517BL-15
LC3517BL-12



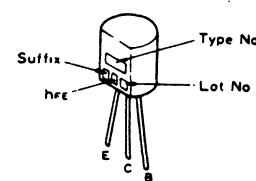
M5218P



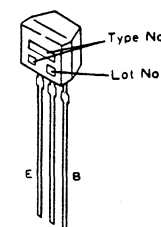
2SA1399
2SC3581



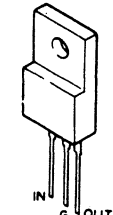
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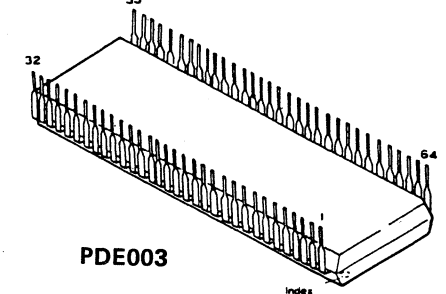
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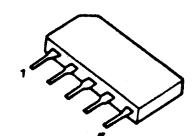
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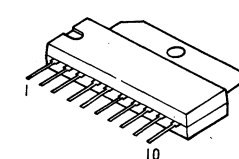
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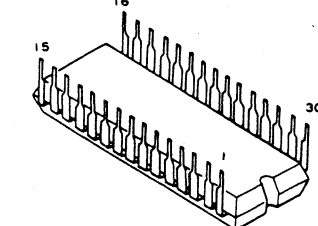
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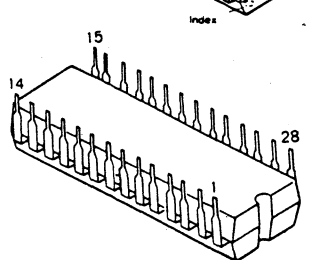
TA8410K



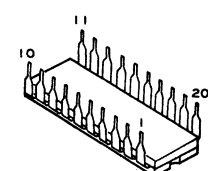
CXA1081S



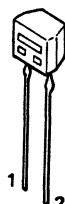
PDE003



LC7881-C

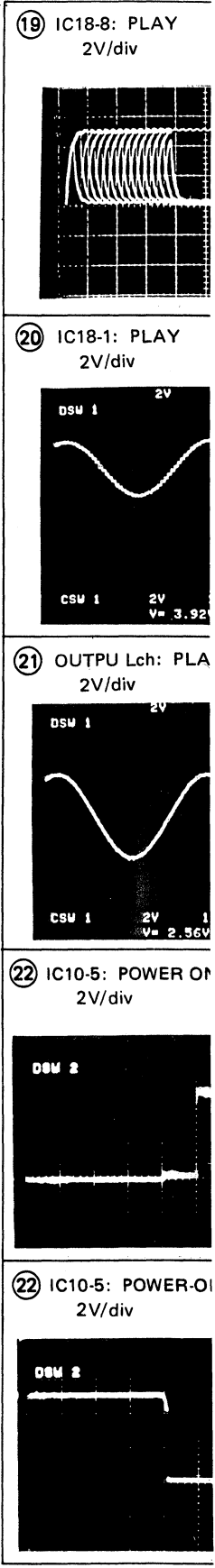
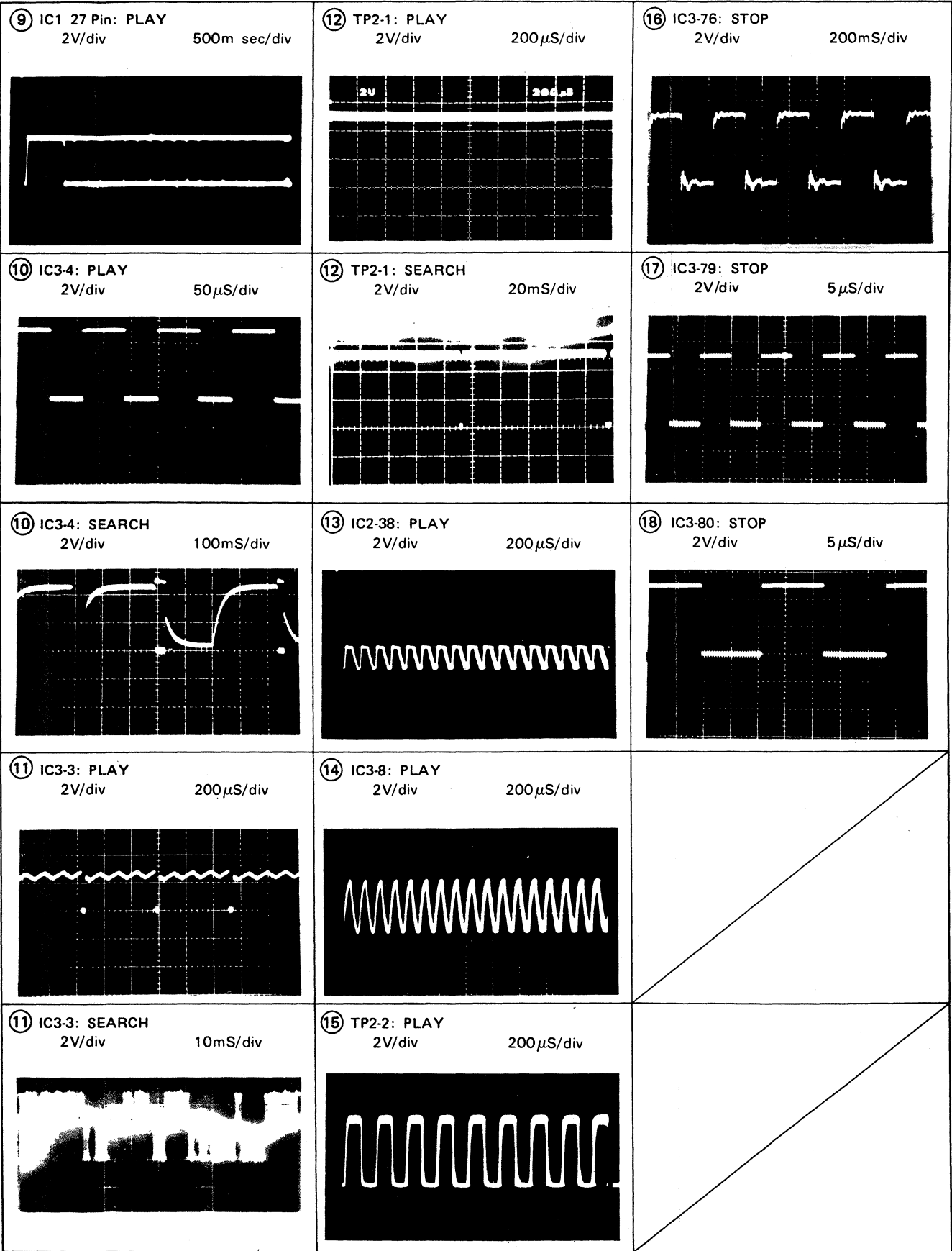
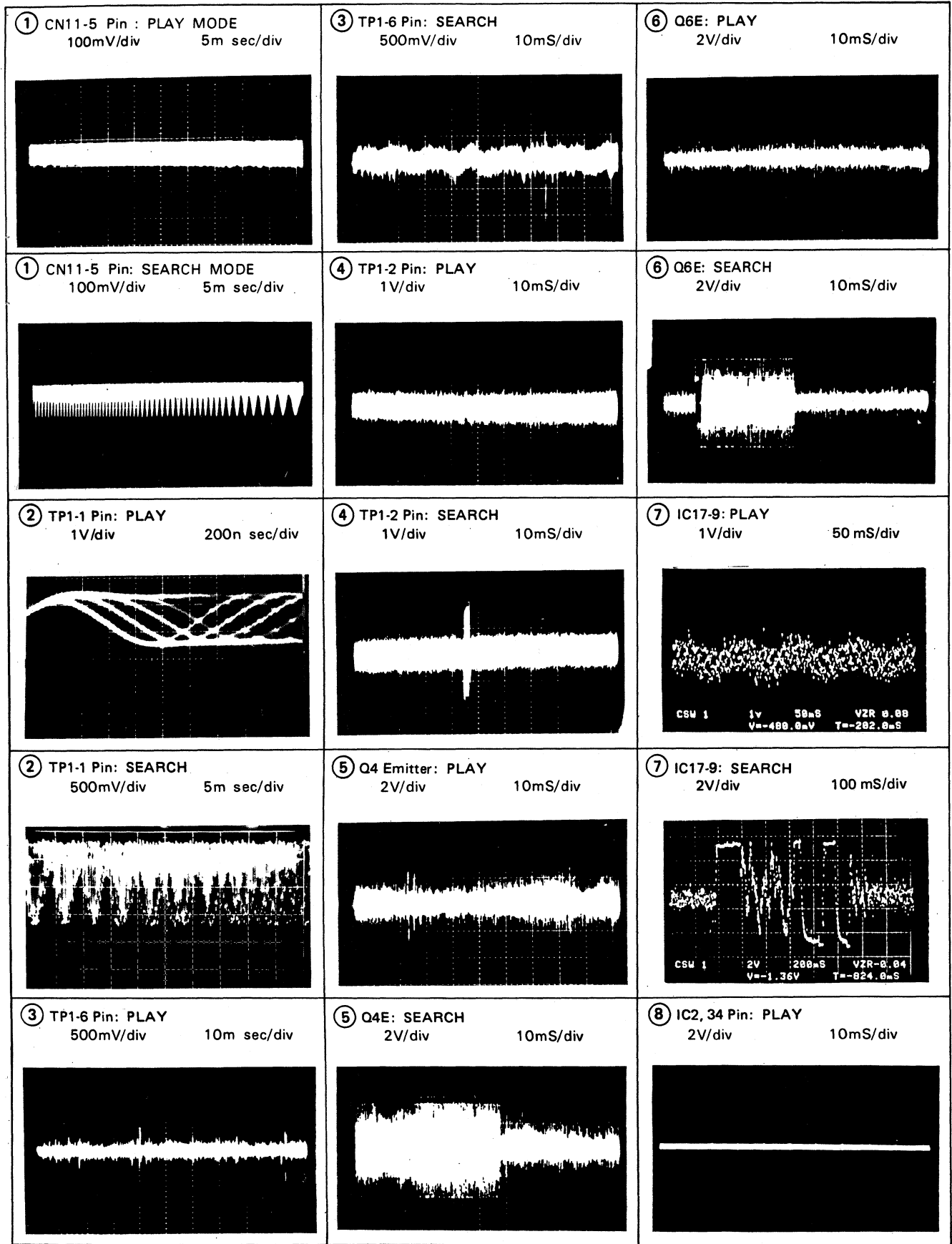


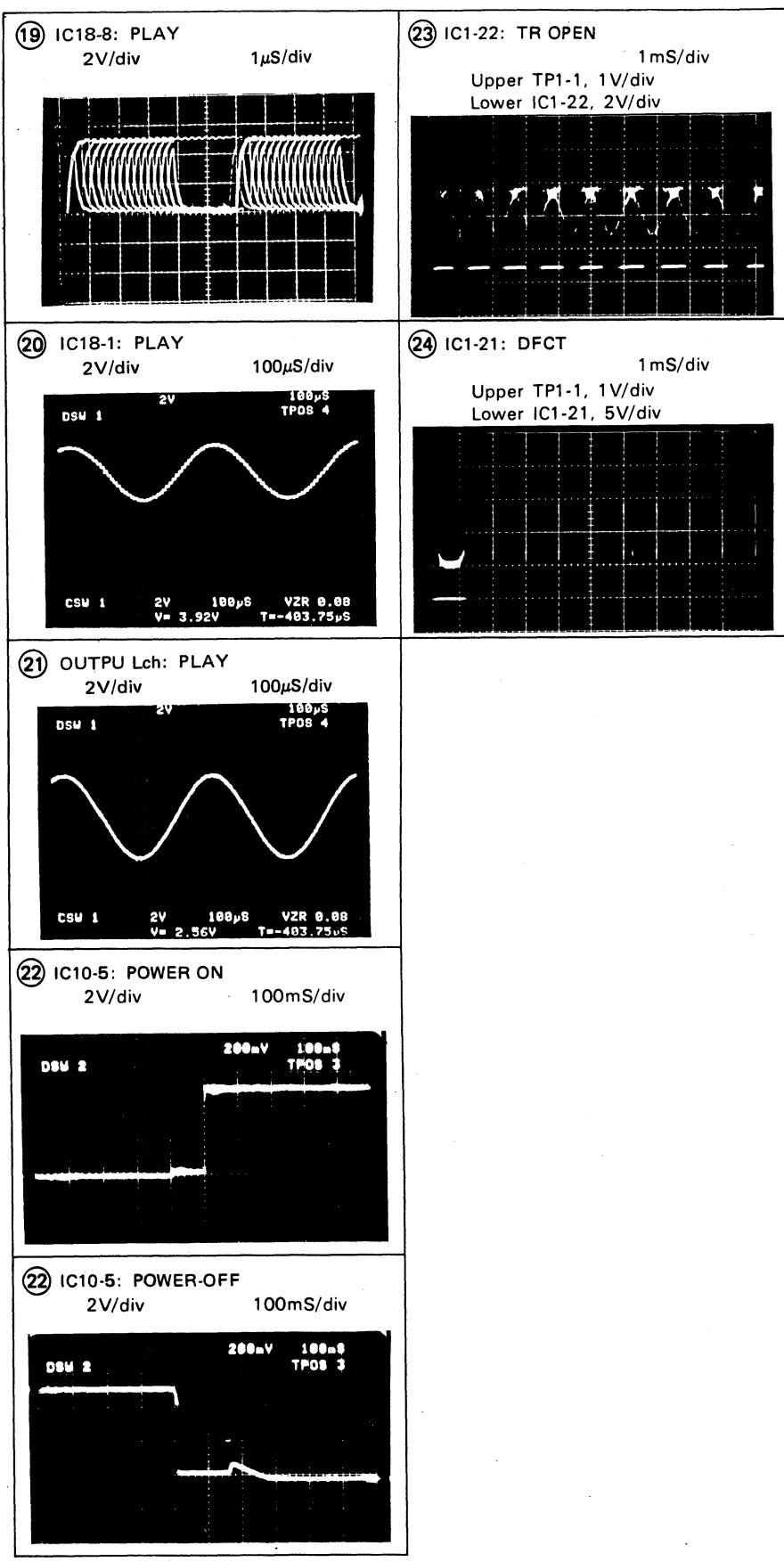
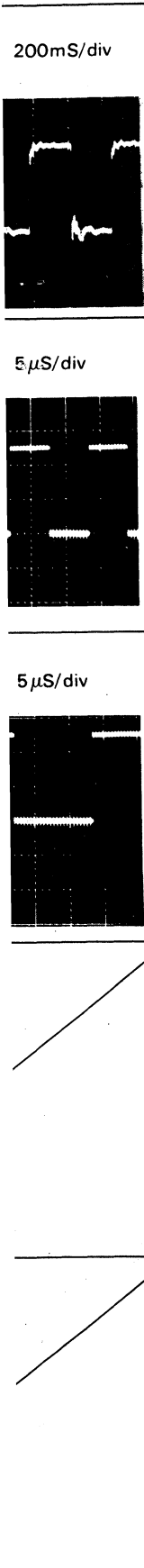
ICP-N10



WAVEFORMS

NOTE: The encircled numbers denote measuring points in the schematic diagram.





8. ELECTRICAL PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★ **GENERALLY MOVES FASTER THAN ★**
- This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560Ω 56 × 10¹ 561..... RD1/4PS 5 6 1 J
47kΩ 47 × 10³ 473..... RD1/4PS 4 7 3 J
0.5Ω 0R5..... RN2H 0 5 K
1Ω 010..... RS1P 0 1 0 K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ 562 × 10¹ 5621..... RN1/4SR 5 6 2 1 F

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
Δ	Main board assembly	PWZ1368
Δ	Function board assembly	PWZ1369
Δ	Transformer board assembly	
Δ	Power switch board assembly	
Δ	Switch board assembly	
Δ	Select board assembly	

OTHERS

Mark	Symbol & Description	Part No.
Δ	Strain relief	CM-22B
Δ	AC power cord	PDG1008
Δ	★ Power transformer (AC220/240V)	PTT1051
Δ	Pick-up assembly	PWY1003
★★	Motor assembly (DISC SELECT, DISC LOADING, CARRIAGE)	PYY1025
★★	Spindle motor	PXM1009
★★	Slide switch (INSIDE SW)	PSH1003

Δ Main Board Assembly (PWZ1368)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC1	CXA1081S
★★	IC2	CXA1082AS
★★	IC3	CXD1135QZ
★★	IC4	LC3517BL-15 (LC3517BL-12)
Δ	★★ IC30-IC33	ICP-N10
Δ	★★ IC16, IC17	TA8410K
★★	IC18	LC7881-C
★★	IC10	M51957AL
★★	IC25, IC24	M5218P

Mark	Symbol & Description	Part No.
Δ	★★ IC11	NJM78M05FA
Δ	★★ IC12	NJM79M05FA
★★	IC7	PDE003
★★	IC6	PD3095
★★	Q10, Q12, Q19	DTC124ES
★★	Q18	2SA1048
★★	Q1, Q5, Q7	2SA1399
★★	Q11, Q15	2SA933S
★★	Q8, Q9, Q16, Q17, Q20-Q22, Q199	2SC1740S
★★	Q4, Q6	2SC3581
★★	Q13, Q14	2SD1302
★	D11	MTZ27B (MTZ27C)
★	D12	MTZ5.1B (MTZ5.1C)
★	D26	MTZ7.5A (MTZ7.5B)
Δ	★ D25	WL02-5004
Δ	★ D10	ISR139-100
★	D17-D19	ISS254

SWITCH

Mark	Symbol & Description	Part No.
★★	S1 Tact switch (TEST MODE)	PSG1002

CAPACITORS

Mark	Symbol & Description	Part No.
	C2-C4, C95, C96	CCCCH300J50
	C127	CCCSL100D50
	C159, C87	CCCSL101J50
	C82, C83	CCCSL221J50
	C40	CEANP4R7M25

Mark	Symbol & Description	Part No.
	C85	CEASR33M50
	C16, C22	CEASR47M50
	C34	CEAS100M50
	C10, C43, C165	CEAS101M10
	C100	CEAS332M25
	C64, C88, C130	CEAS101M50
	C102, C103	CEAS102M16
	C71, C72, C93, C94	CEAS220M50
	C101	CEAS222M25
	C5, C7, C12, C15, C20, C23, C26, C36, C38, C41, C47, C50, C60-C63, C79, C80, C84, C97, C131, C132, C154, C155, C161	CEAS330M35
	C48, C151	CEAS4R7M50
	C90	CEAS470M50
	C73, C74	CFTXA472J50
	C67, C68	CFTXA683J50
	C91, C160	CKCYF103Z50
	C86, C134, C135	CKCYF473Z50
	C33, C51	CQMA102J50
	C1, C14, C17, C46	CQMA103K50
	C31, C32, C35, C39, C69, C70	CQMA104K50
	C27	CQMA153K50
	C29	CQMA272J50
	C13, C156	CQMA332J50
	C9, C11, C21	CQMA333K50
	C49	CQMA472K50
	C77, C78	CQMA821J50
	C121, C122	CQSA102J50
	C75, C76	CQSA471J50

RESISTORS

Mark	Symbol & Description	Part No.
★ VR2	Semi-fixed resistor (10k Ω)	VRTB6VS103
★ VR3-VR7	Semi-fixed resistor (22k Ω)	VRTB6VS223
★ VR8	Semi-fixed resistor (1k Ω)	VRTS6VS102
R144	Resistor array (47 Ω x 4)	RA4S473J
R145	Resistor array (47 Ω x 6)	RA6S473J
R30	Metal thin film	RN1/6PQ3601F
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
JA1	2P pin jack (AUDIO OUT)	PKB1009
JA2	3.5 ϕ mini jack (CONTROL)	RKN-071
★ X2	Ceramic resonator (800 kHz)	KBR-800H
★ X3	Crystal resonator (8.4672 MHz)	PSS-012

Power Switch Board Assembly

SWITCH

Mark	Symbol & Description	Part No.
△ ★★ S401	Push switch (POWER)	PSA-009

CAPACITORS

Mark	Symbol & Description	Part No.
△ C401	(0.01 μ F/AC400V)	RCG-009 (VCG-044)

Transformer Board Assembly

CAPACITORS

Mark	Symbol & Description	Part No.
△ C301, C304, C305		CKCYF103Z50
C302, C303, C306, C307		CKCYF103Z50

◎ Function Board Assembly (PWZ1369)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★ Q201		2SC1740S
★ D201-D206		1SS254

SWITCHES

Mark	Symbol & Description	Part No.
★★ S201-S218	Tact switch (OPERATION)	PSG1002

RESISTORS

Mark	Symbol & Description	Part No.
	R211, R212	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
★ V201	Fluorescent indicator tube	PEL1017

Select Board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★★ Q601		GP1A52HR

SWITCH

Mark	Symbol & Description	Part No.
★★ S601	Slide switch (MODE)	PSH1005

CAPACITOR

Mark	Symbol & Description	Part No.
	C601	CEAL100M16

RESISTORS

Mark	Symbol & Description	Part No.
	All resistors	RD1/6PM□□□J

Switch Board Assembly

SWITCHES

Mark	Symbol & Description	Part No.
★★ S701-S704	Slide switch (LOADING POSITION, MAGAZINE)	PSH1004

9. ADJUSTMENTS

The adjustment items of this model should be performed in the order as shown below.

• Adjustment and check Items

1. Tracking offset, focus offset and RF offset adjustments
2. RF level adjustment
3. LD (Laser Diode) output power confirmation
4. Focus lock and spindle lock confirmation
5. Grating adjustment
6. Tracking balance adjustment
7. Tangential adjustment
8. Focus gain adjustment
9. Tracking gain adjustment
10. VCO free-run frequency adjustment
11. Method to confirm S character (FOCUS ERROR)

• Measuring Equipment

1. Dual trace oscilloscope
2. Laser power meter
3. Test disc (YEDS7)
4. Tracking balance adjustment filter
5. Loop gain adjustment filter
6. Signal generator
7. Frequency counter
8. Other general tools

• Test Mode

All the adjustments should be performed in Test Mode.

Test Mode setting and cancellation procedures

- (1) To set the Test Mode, turn the POWER switch of the player (S401) ON pushing the TEST MODE SWITCH (S1).
- (2) To cancel the Test Mode, simply turn the POWER switch of the player OFF.

The various key functions in the Test Mode are listed in Table 9-1.

• Adjusting Points

- VR1: Laser power
- VR7: Tracking offset (TRK.OFS)
- VR3: Focus gain (FCS.GAN)
- VR4: Tracking gain (TRK.GAN)
- VR5: Tracking balance (TRK.BAL)
- VR6: Focus offset (FCS.OFS)
- VR8: VCO adjustment (VCO.ADJ)
- VR2: RF offset (RF.OFS)

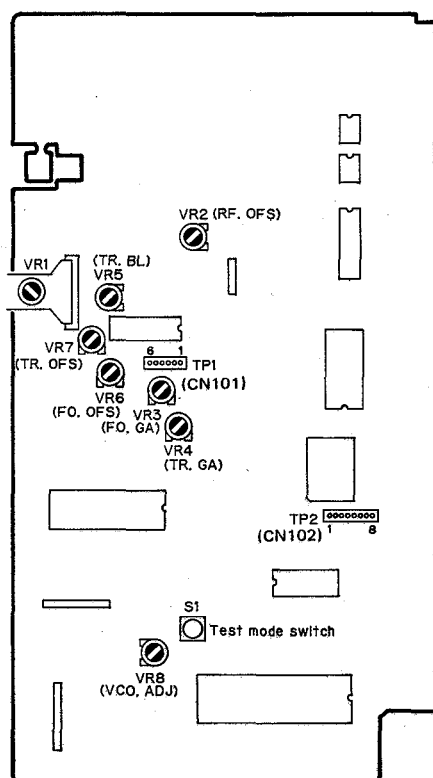


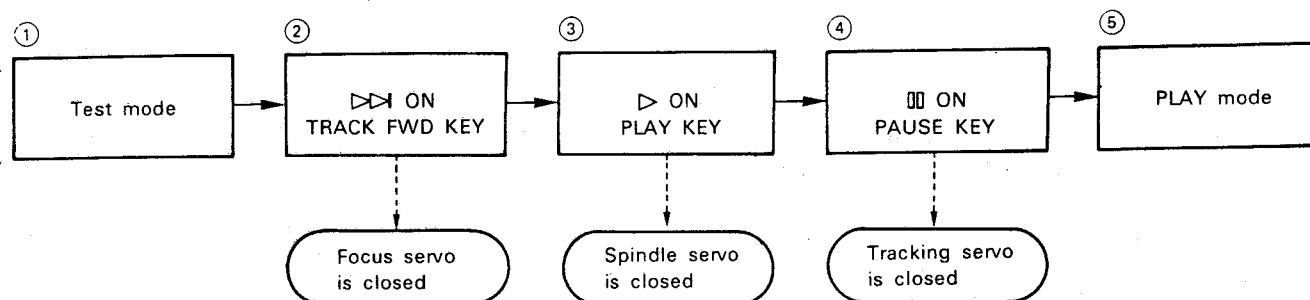
Fig. 9-1 Adjusting point

In the Test Mode, each servo circuit can be closed and opened by separate operations. Consequently, each servo must be closed one at a time (in serial sequence) to set PLAY mode.

Note that PLAY mode is not activated by simply pressing the PAUSE key () in the Test Mode.

Example: Switching from STOP to PLAY mode.

* The each servo mechanisms operate in a serial sequence in the Test Mode.



• Key Functions in Test Mode

Symbol	Key name	Function during test mode	Description
	TRACK FWD	Focus servo is closed.	Laser diode lights up. Actuator is moved up/down, then focus servo is closed.
	PLAY	Spindle servo is closed.	Spindle starts to rotate and the servo is closed when it turns into the CLV-A servo mode.
	PAUSE	Tracking servo is closed/opened.	Performs toggle operation. Closing the tracking servo and becomes PLAY mode by depressing the key (Focus servo and spindle servo must be closing), and PAUSE indicator lights up. Tracking servo opens by depressing the key again.
	MANUAL SEARCH REV	Carriage moves in reverse direction. (towards disc center)	Carriage is moved towards disc center at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
	MANUAL SEARCH FWD	Carriage moves in forward direction. (towards disc end)	Carriage is moved towards disc end at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
	STOP	STOP	All servos are opened.
	EJECT	(CD Magazine) EJECT	CD Magazine is ejected. However, pickup does not return to the park position. Moreover, even when disc is closed the pickup remains as is.

Table 9-1

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
1	TRACKING OFFSET, FOCUS OFFSET AND RF OFFSET ADJUSTMENT					
			TP1 PIN 2 (TRK.ERR) TP1 PIN 6 (FCS.ERR) TP1 PIN 1 (RF OUTPUT)	VR5 (TRK.BAL) VR7 (TRK.OFS) VR6 (FCS.OFS) VR2 (RF.OFS)	45° 0V±50 mV FOCUS offset 0V±50 mV RF offset 100 mV±50 mV	• Set to TEST mode. (See page 28.) • Turn VR5 TRK.BAL (Tracking balance) volume clockwise 45° from the center. • Adjust with VR7 TRK.OFS (Tracking offset) volume so that the voltage of pin 2 TRK.ERR (Tracking error) of TP1 becomes 0V±50 mV. • Adjust VR6 FCS.OFS (focus offset) so that the FCS.ERR (focus error) voltage at TP1 pin 6 becomes 0V±50 mV. • Adjust VR2 RF.OFS (RF offset) so that the RF output voltage at TP1 PIN 1 becomes 100 mV±50 mV.
2	RF LEVEL ADJUSTMENT					
			TP1 Pin 1 (RF)	VR1 Laser power	1.5Vp-p+0.2V -0V	• Set to TEST mode. (See page 28.) • Play TEST disc and connect probe of an oscilloscope to pin 1 RF (RF output) of TP1 and measure the P-P voltage of RF waveform. • Adjust VR1 (Laser power) so that the value is within 1.5 Vp-p+0.2V -0V .
3	LD (LASER DIODE) OUTPUT POWER CONFIRMATION					
					Confirmation: less than 0.13 mW	• Set to TEST mode. (See page 28.) • Press TRACK FWD key (▶▶) and turn ON LD (laser diode). • Place sensor of the laser power meter immediately above the object lens and confirm that the output power of the LD is less than 0.13 mW.
4	FOCUS LOCK AND SPINDLE LOCK CONFIRMATION					
	0.5V/div	100 msec/div	TP1 Pin 1 (RF output)		RF output exists Normal rotation	• Set TEST disc. • Set to TEST mode. (See page 28.) • Shift the pickup close to the center of the disc by pressing the MANUAL SEARCH FWD key (▶▶). * Note that this step must be performed. • Observe pin 1 RF (RF output) of TP1 with an oscilloscope and confirm that the RF signal is output after pressing the TRACK FWD key (▶▶). • Press PLAY key (▶) and be sure that the disc rotates in normal direction at almost the specified speed (as it is close to the center of the disc, the rotating speed is around 30 rpm) and not rotates abnormally or inversely.

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
9	AJUSTE DE GANANCIA DE SEGUIMIENTO					
	50 mV/div. 5 mV/div. CN1 (X), CH2 (Y) (SONDA 10:1)	Eje X Patilla 3 de TP1 (TRK.ERR) Eje Y Patilla 2 de TP1 (TRK.ERR)	VR4 (TRK.GAN)	90° de diferencia	- En el estado de POWER OFF (apagado), conecte un osciloscopio y un oscilador como se muestra en la Fig. 9-7. - Ajuste el modo de TEST. (Vea la página 50.) - Presione la tecla de TRACK FWD (), la tecla de PLAY (), y la tecla de PAUSE () secuencialmente, y encienda el servo del enfoque, el del eje y el de seguimiento. - Encienda el oscilador y extraiga 1,2 kHz 1 Vp-p. Nota: (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por la tanto, es conveniente conectar el oscilador después del encendido.) - Ajuste con el volumen de TRAK GAN de VR4 (Ganancia de seguimiento) de modo que la figura de Lissajous del osciloscopio llege a ser un círculo horizontal (90° de diferencia de fase).	

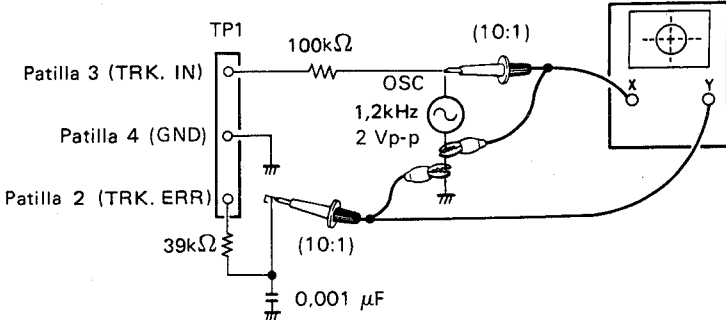


Fig. 9-7

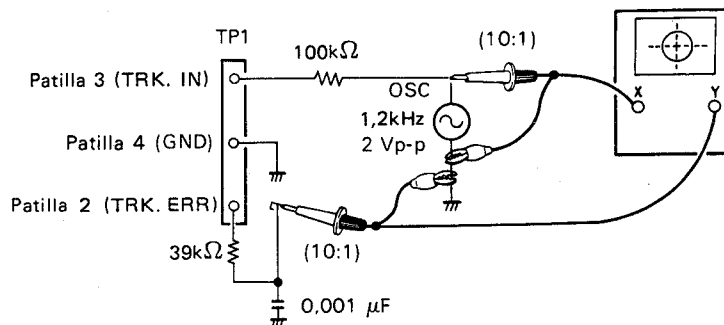


Fig. 9-7



Foto. 9-13 Alta ganancia



Foto. 9-14 Ganancia óptima

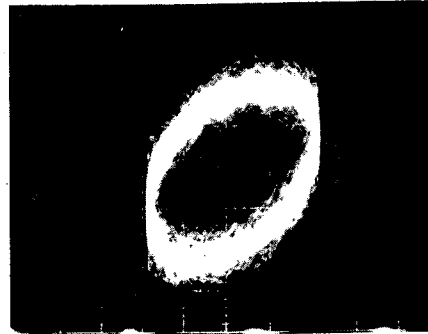
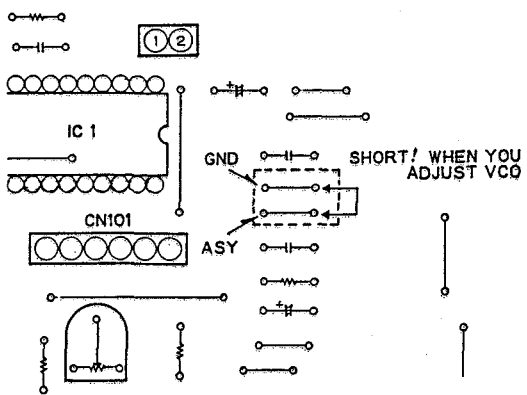
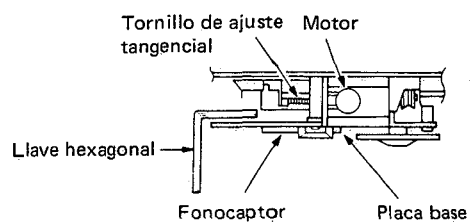


Foto. 9-15 Baja ganancia

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
10	AJUSTE DE LA FRECUENCIA PROPIA DE VCO					
			Patilla 2 de TP2	VR8 (VCO.ADJ)	4,375±0,025 MHz	• Ajuste el modo de TEST. (Vea la página 50.) • Haga un cortocircuito entre ASY y la conexión volante de GND con impulsor de retículo, etc. (Fig. 9-8) • Conecte el frecuencímetro, que pueda medir arriba de 10 MHz, a la patilla 2 de TP2. • Ajuste con el volumen VCO ADJ (ajuste de VCO) de VR8 de modo que el valor del frecuencímetro se ponga en 4,375±0,025 MHz. 
11	METODO PARA CONFIRMAR EL CARACTER S (ERROR DE ENFOQUE)					
						• Ajuste el modo de TEST. (Vea la página 50.) • Haga un cortocircuito entre FCS.IN (Entrada de enfoque) de la patilla 5 de TP1 y GND. • Presione la tecla de TRACK FWD (▶▶) y observe la forma de onda de FCS.ERR (Error de enfoque) de la patilla 6 de TP1 con un osciloscopio.



En la figura siguiente, las partes superior e inferior son opuestas a las del producto real.

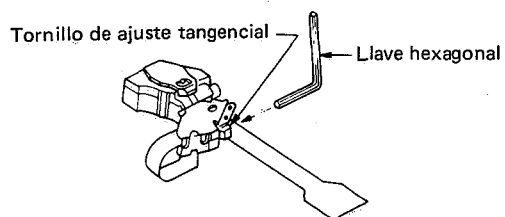


Fig. 9-5 Ajuste tangencial

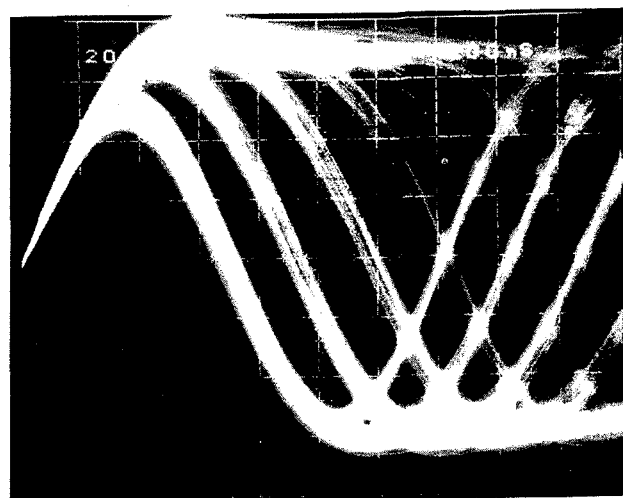


Foto. 9-7

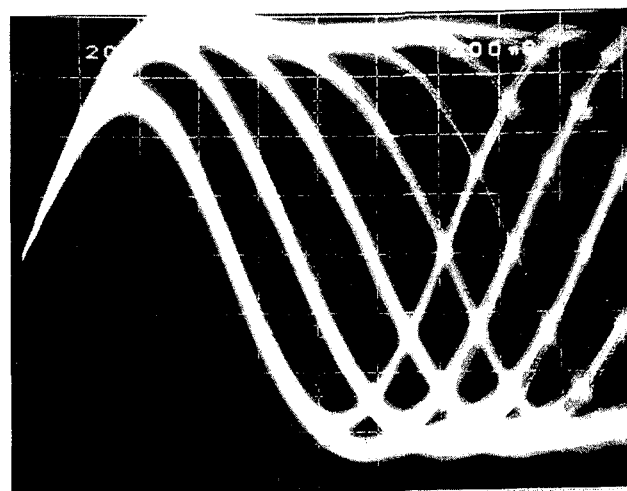
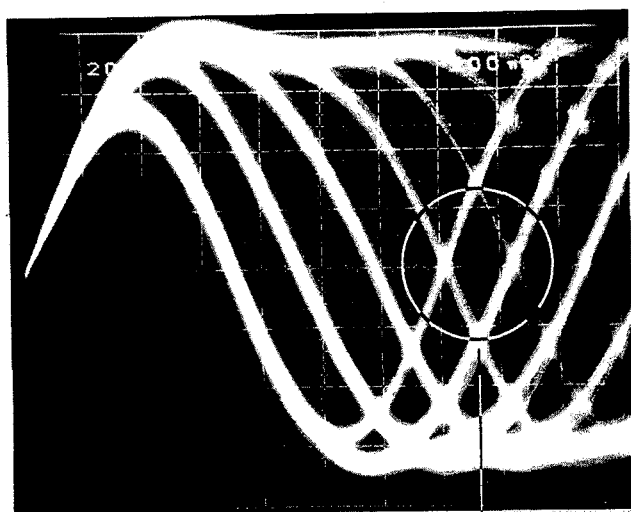


Foto. 9-8



Parte a ser observada

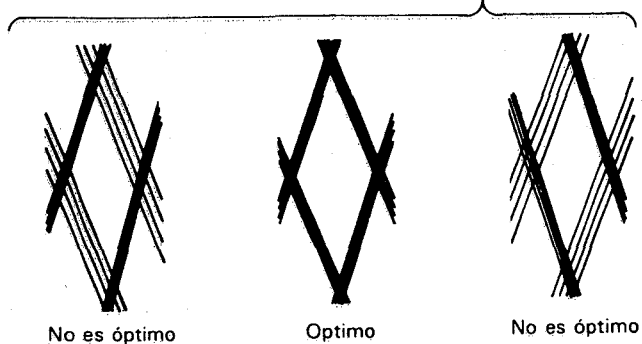


Foto. 9-6

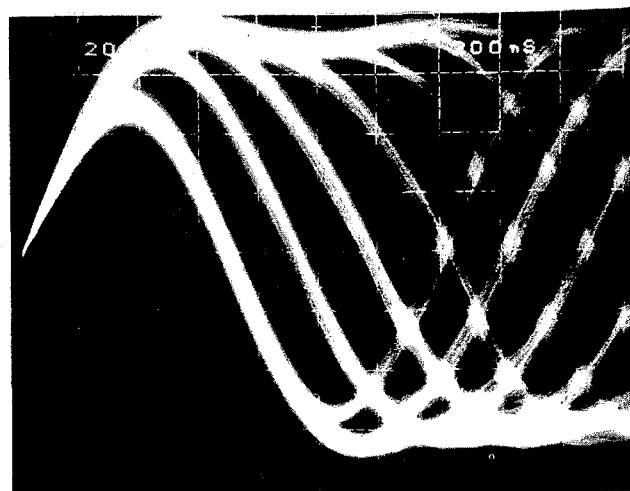
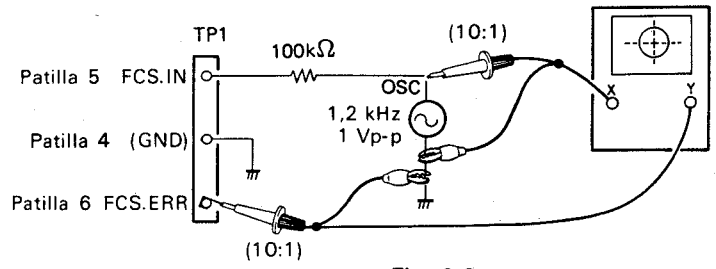


Foto. 9-9

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
8	AJUSTE DE GANANCIA DE ENFOQUE					
	20 mV/div.5/mV/div. CH1 (X), CH2 (Y) (SONDA 10:1)	Eje X Patilla 5 de TP1 (FCS.IN) Eje Y Patilla 6 de TP1 (FCS.ERR)	VR3 (GANACIA FCS)	Diferencia de fase 90°	• En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 9-6. • Ajuste el modo de TEST. (Vea la página 50.) • Presione la tecla de TRACK FWD (), la tecla de PLAY () y la tecla de PAUSE () secuencialmente, y encienda el servo de enfoque, el del eje y el de seguimiento. • Encienda el oscilador y extraiga 1,2 kHz 1 Vp-p. Nota: (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por lo tanto, es conveniente conectar el oscilador después del encendido.) • Ajuste con el volumen de FCS.GAN (Ganancia de enfoque) de VR3 de modo que la figura de Lissajous del osciloscopio a ser un círculo horizontal (90° de diferencia de fase).	

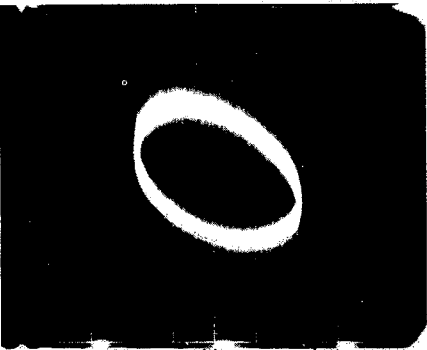


Foto. 9-10 Alta ganancia

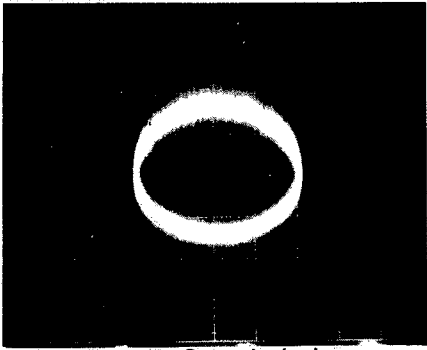


Foto. 9-11 Ganacia óptima

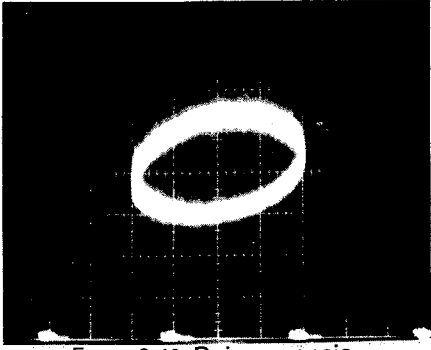
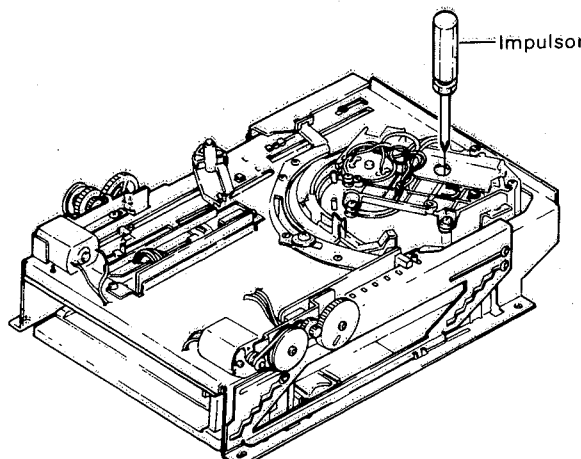
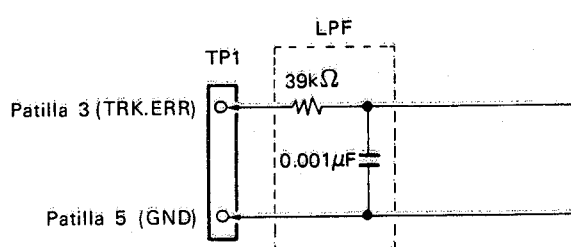


Foto. 9-12 Baja ganancia

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
5	AJUSTE DE LA MIRA					
	 Fig. 9-2  Fig. 9-3					• Ajuste el mode TEST. (Vea la página 50.) • Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (>>) de modo que el tornillo de ajuste de retículo del captador pueda ser visto a través del orificio oval en el lado superior del servomecanismo. • Inserte un impulsor de retículo en el orificio del lado superior or del mecanismo como se muestra en la Fig. 9-2, y confirme que gira el tornillo de retículo. • Presione la tecla de TRACK FWD (>>>) y la tecla de PLAY (>) secuencialmente y cierre el servo de enfoque y el del eje. (No cierre el servo de seguimiento.) • Observe la forma de onda en TRCK.ERR (Error de seguimiento) de la patilla 3 de TP1 con un osciloscopio. Luego inserte un filtro de paso bajo de corte. (Fig. 9-3)
0.5V/div	5 ms/div	TRK.ERR de la patilla 2 de TP1	Retículo	Punto cero Amplitud máxima	• Gire el impulsor de retículo y encuentre el punto cero (Foto. 9-1) • Luego, gire lentamente el impulsor de retículo hacia el sentido contrario del reloj desde el punto cero y ajuste en el punto donde la forma de onda (Señal de error de seguimiento) primeramente se ponga a una amplitud máxima. (Vea Foto 9-3) Nota: Si el impulsor de retículo se presiona fuertemente, el captador se mueve hacia el centro del disco, por consiguiente el ajuste resulta difícil. • Finalmente, asegúrese de confirmar que la señal de error de seguimiento (en este momento, no se ha insertado el filtro de paso bajo de corte de 4 kHz) cuando el captador se mueve hacia el centro del disco y el voltaje de P-P de la señal de error de seguimiento en la circunferencia exterior del disco no haya variado considerablemente. Cuando se desvíe el nivel arriba de $\pm 10\%$, ajuste de nuevo girando el tornillo de retículo a un punto de amplitud de error mínimo.	

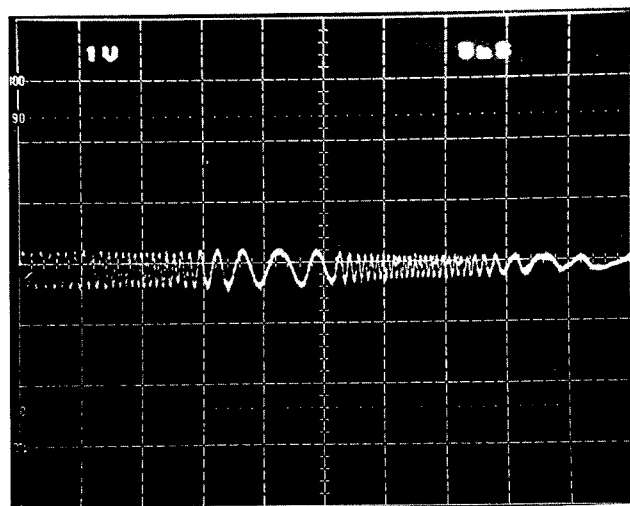


Foto. 9-1 Punto cero

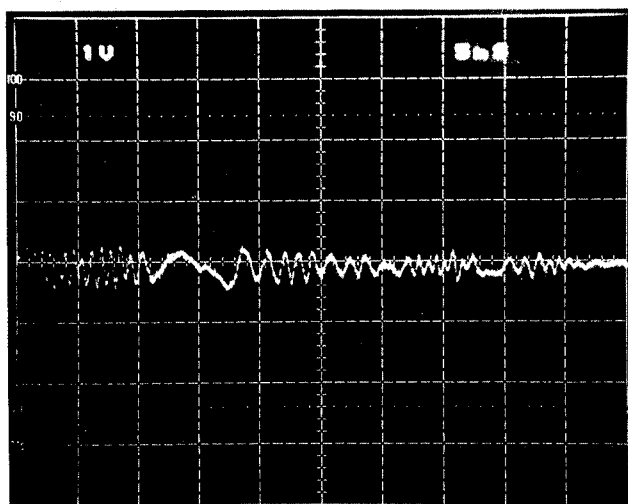


Foto. 9-2 Forma de onda de un punto no cero



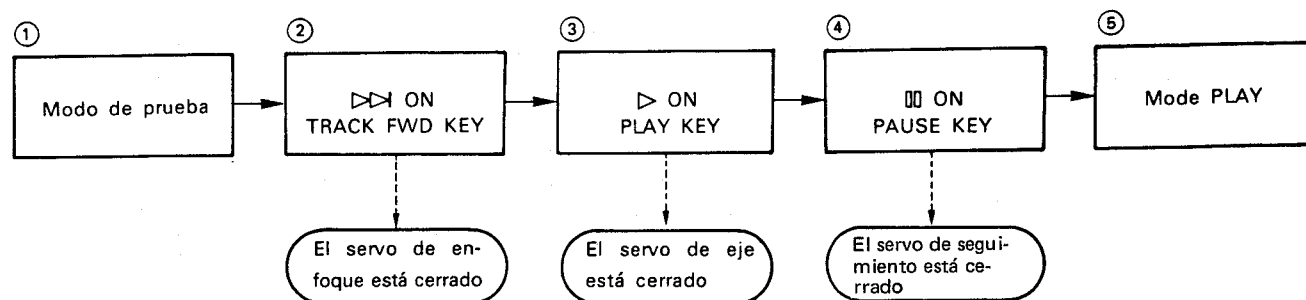
Foto. 9-3 Amplitud máxima

En el modo de prueba, cada servocircuito puede ser cerrado y abierto por operaciones separadas. Consecuentemente, cada servo deberá ser cerrado uno a la vez (en secuencia en serie) para ajustar el modo de PLAY (reproducción).

Fijese que el modo de PLAY no se activa simplemente presionando la tecla de PAUSE (pausa) () en el modo de prueba.

Ejemplo: Conmutando del modo de STOP (parado) a PLAY.

* Cada servomecanismo funciona en una secuencia en serie en el modo de prueba.

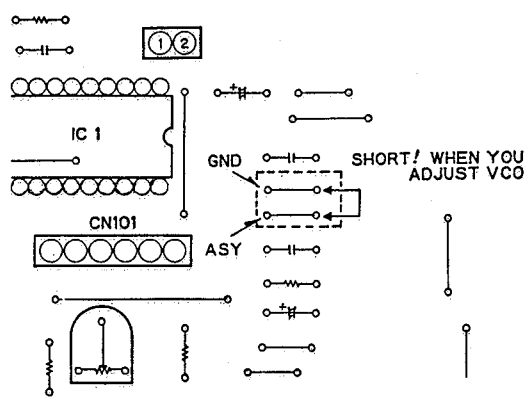


• Funciones de tecla en el modo de prueba

Símbolo	Nombre de tecla	Función durante el modo de prueba	Descripción
	TRACK FWD	El servo de enfoque está cerrado.	El diodo láser se enciende. El actuador se mueve arriba/abajo, luego se cierra el servo de enfoque.
	PLAY	El servo de eje está cerrado.	El eje comienza a rotar y se cierra el servo cuando se convierte en el modo de servo CLV-A.
	PAUSE	El servo de seguimiento está cerrado/abierto	Ejecuta la operación de conexión oscilante. Cuando se cierra el servo de seguimiento y se pone en el modo de PLAY presionando esta tecla (el servo de enfoque y el del eje deberán estar cerrados), y el indicador de pausa se enciende. El servo de seguimiento se abre presionando de nuevo la tecla.
	MANUAL SEARCH REV	El carro se mueve en la dirección inversa (hacia el centro del disco)	El carro se mueve hacia el centro del disco a una alta velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
	MANUAL SEARCH FWD	El carro se mueve en la dirección hacia delante. (hacia el final del disco)	El carro se mueve hacia el final del disco a una alta velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
	STOP	PARADO	Todos los servos están abiertos.
	EJECT	(Cargador de discos compactos)	El cargador de discos compactos. Sin embargo, el captador no regresa a su posición de aparcamiento. Además, aun cuando se cierra el disco el captador permanece tal como está.

Tabla 9-1

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
1 AJUSTES DE COMPENSATION DE SEGUIMIENTO, FOCO Y RF						
			Patilla 2 de TP1 (TRK. ERR)	VR5 (TRK.BAL) VR7 (TRK.OFS)	45° 0V±50 mV	- Ajuste el modo de prueba. (vea la página 50.) - Gire el volumen de TRK.BAL (Equilibrio de seguimiento) de VR5 en el sentido de las manecillas del reloj 45° del centro. - Ajuste VR7 TRK.ERR (de seguimiento) de modo que el voltaje en TRK.ERR (desviación de seguimiento) de la patilla 2 de TP1 se ponga en 0V±50 mV.
			Patilla 6 de TP1 (FCS. ERR)	VR6 (FCS. OFS)	Compens. de foco 0V ± 50mV	Ajuste VR6 FCS.OFS (compensación de foco) de modo que el voltaje de FCS.ERR (error de foco) en la patilla 6 de TP1 sea 0V ± 50mV.
			Patilla 1 de TP1 (RF OUTPUT)	VR2 (RF OFS)	Compens. de RF 100mV ± 50mV	Ajuste VR2 RF.OFS (compensación de RF) de modo que el voltaje de salida de RF en la patilla 1 de TP1 sea 100 mV ± 50 mV.
2 AJUSTE DEL NIVEL DE RF						
			Patilla 1 de TP1 (RF)	Alimentación del laser VR1	1,5 V _{p-p} ^{+0,2} ₋₀ V	- Ajuste el modo de TEST. (Vea la página 50.) - Reproduzca el disco de TEST y conecte la sonda de un osciloscopio a la RF de la patilla 1 (Salida de RF) de TP1 y mida el voltaje de P-P de la forma de onda de RF. - Ajuste UR1 (alimentación del láser) que el valor sea 1,5V_{p-p}^{+0,2}₋₀ V
3 CONFIRMACION DE ALIMENTACION DE ALIDA DE LD (DIODO LASER)						
					Confirmación Menos de 0,13 mW	- Ajuste el modo de prueba. (vea la página 50.) - Presione la tecla de TRACK FWD () y encienda el LD (Diodo láser). - Ubique el sensor del medidor de potencia del láser inmediatamente arriba del objetivo, y confirme que la potencia de salida del LD sea menos de 0,13 mW.
4 CONFIRMACION DE BLOQUEO DE ENFOQUE Y DEL EJE						
	0.5V/div	100 mseg/div	Patilla 1 de TP1 (Salida de RF)		Existe salida de RF Rotación normal	- Ajuste del disco de TEST. - Ajuste del mode de TEST. (Vea la página 50.) - Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (). * Tenga en cuenta que este paso deberá ser ejecutado. - Observe RF (Radio frecuencia) de la patilla 1 de TP1 con un osciloscopio y confirme que se saque la señal de RF después de presionar la tecla de TRACK.ERR (). - Presione la tecla de PLAY () y asegúrese que el disco rota en la dirección normal casi a la velocidad especificada (tal como está cerca del centro del disco, la velocidad de rotación es alrededor de 30 rpm) y que no rote anormalmente o inversamente.

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
10. RÉGLAGE DE LA FRÉQUENCE PROPRE DU VCO						
			TP2 Broche 2	VR8 (VCO.ADJ)	4,375 ±0.025 MHz	• Régler le mode d'essai (TEST). (Voir page 39.) • Court-circuiter entre les ponts ASY et GND au moyen de l'outil de réseau, etc. (Figure 9-8) • Raccorder un fréquencemètre capable de mesurer au-dessus de 10 MHz à la broche 2 de TP2. • Ajuster le potentiomètre VR8 VCO ADJ (réglage du VCO) de façon à ce que la valeur indiquée par le fréquencemètre devienne égale à 4,375±0,025 MHz. 
11. MÉTHODE DE CONTRÔLE DE LA CARACTÉRISTIQUE S (ERREUR DE FOCALISATION)						
						• Régler le mode d'essai (TEST). (Voir page 39.) • Réaliser un court-circuit entre la broche 5 FCS.IN (entrée de focalisation) de TP1 et la terre GND. • Appuyer sur la touche d'avance de piste (TRACK FWD) () et observer simultanément la forme d'onde à la broche 6 FCS.ERR (erreur de focalisation) de TP1 au moyen d'un oscilloscope.

9. AJUSTE

Los items de ajuste de este modelo deberán ser efectuados en el orden mostrado abajo.

• Items de ajuste y comprobación

1. Ajuste de desviación de seguimiento, foco y RF.
2. Ajuste del nivel de RF
3. Confirmación de la alimentación de salida de LD (diodo láser)
4. Confirmación de enclavamiento del enfoque y del eje
5. Ajuste del retículo
6. Ajuste del equilibrio de seguimiento
7. Ajuste tangencial
8. Ajuste de la ganancia de enfoque
9. Ajuste de la ganancia de seguimiento
10. Ajuste de la frecuencia propia de VCO
11. Método para confirmar el carácter S (error de enfoque)

• Equipo de medición

1. Osciloscopio de doble traza
2. Medidor de alimentación del láser
3. Disco de prueba (YEDS7)
4. Filtro de ajuste de equilibrio de seguimiento
5. Filtro de ajuste de ganancia de bucle
6. Generador de señal
7. Contador de frecuencia
8. Otras herramientas generales

• Modo de prueba

Todos los ajustes deberán ser ejecutados en el modo de prueba.

Ajuste del modo de prueba y los procedimientos de cancelación

- (1) Para disponer el modo de prueba, coloque en ON el interruptor POWER del reproductor (S401) mientras presiona el interruptor TEST MODE (S1). (terminales del modo de ajuste).
- (2) Para cancelar el modo de prueba, simplemente gire el interruptor de POWER del reproductor a OFF.

Las varias funciones de tecla en el modo de prueba están enlistadas en la Tabla 9-1.

• Puntos de ajuste

- VR1: Alimentación del láser
 VR7: Desviación del seguimiento (TRK.OFS)
 VR3: Ganancia de enfoque (FCS.GAN)
 VR4: Ganancia de seguimiento (TRK.GAN)
 VR5: Equilibrio de seguimiento (TRK.BAL)
 VR6: Desviación de enfoque (FCS.OFS)
 VR8: Ajuste de VCO
 VR2: Compensación de RF (RF.OFS)

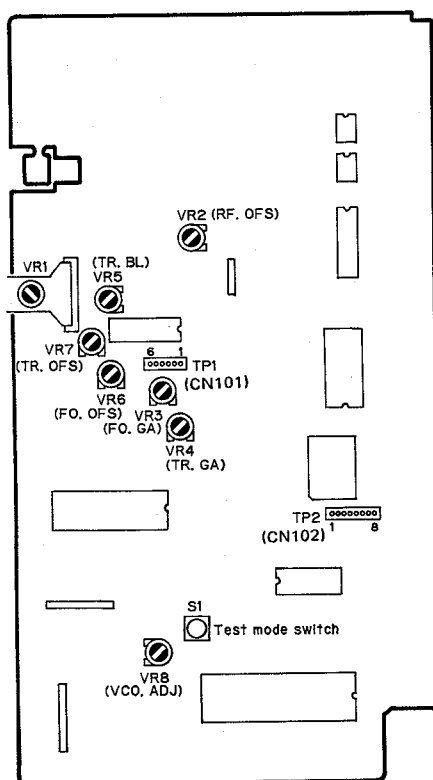


Fig. 9-1 Punto de ajuste

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
8. RÉGLAGE DU GAIN DE FOCALISATION						
	20 mV/div. 5 mV/div. Canal 1(X), Canal 2(Y) (Sonde 10:1)	Axe X TP1 Broche 5 (FCS.IN) Axe Y TP1 Broche 6 (FCS.ERR)	VR3 (FCS.GAN)	Différence de phase 90°.	• L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 9-6. • Régler le mode d'essai (TEST). (Voir page 39.) • Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) (▷), de lecture (PLAY) (▷) et de pause (PAUSE) (⏏), puis enclencher chaque asservissement de focalisation, moyeu et centrage de piste. • Enclencher l'alimentation de l'oscillateur et délivrer un signal de 1,2 kHz à 1 Vc-c. Note: (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.) • Ajuster le potentiomètre VR3 FCS.GAN (gain de focalisation) de façon à ce que la figure de Lissajou observée sur l'oscilloscope devienne un cercle horizontal (déphasage 90°).	

Fig. 9-6

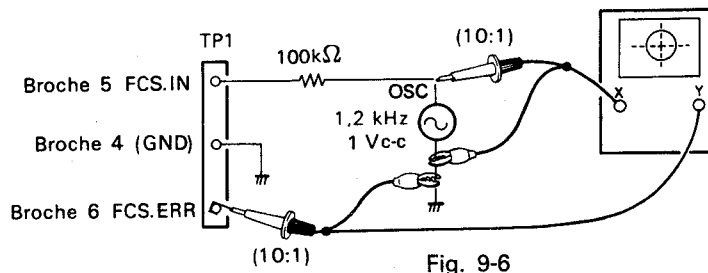


Photo. 9-10 Gain élevé

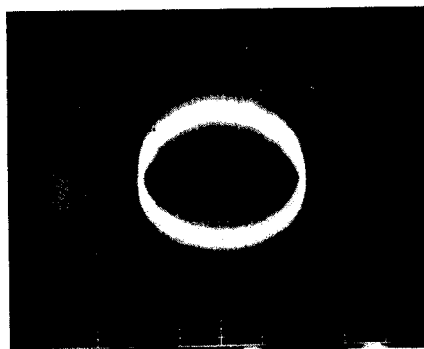


Photo. 9-11 Gain optimum

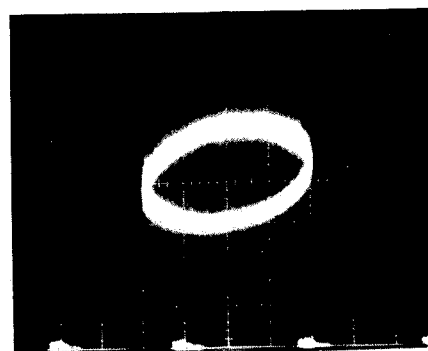


Photo. 9-12 Gain réduit

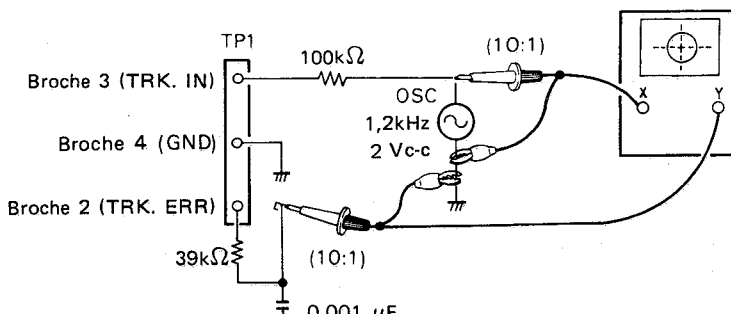
Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
9. RÉGLAGE DU GAIN DE CENTRAGE DE PISTE						
	50 mV/div. 5 mV/div. Canal 1 (X), Canal 2 (Y) (Sonde 10:1)		Axe X TP1 Broche 3 (TRK.IN) Axe Y TP1 Broche 2 (TRK.ERR)	VR4 (TRK.GAN)	Déphasage 90°	• L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 9-7. • Régler le mode d'essai (TEST). (Voir page 39.) • Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) ($\blacktriangleright$), de lecture (PLAY) ($\blacktriangleright$) et de pause (PAUSE) ($\square$), puis enclencher chaque asservissement de focalisation, moyeu et centrage de piste. Enclencher l'alimentation de l'oscillateur et fournir un signal de 1,2 kHz à 2 Vc-c. Note: (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.) • Ajuster le potentiomètre VR4 TRK GAN (gain de centrage de piste) de façon à ce que la figure de Lissajou sur l'oscilloscope devienne un cercle horizontal (déphasage 90°).
 Fig. 9-7						



Photo. 9-13 Gain élevé

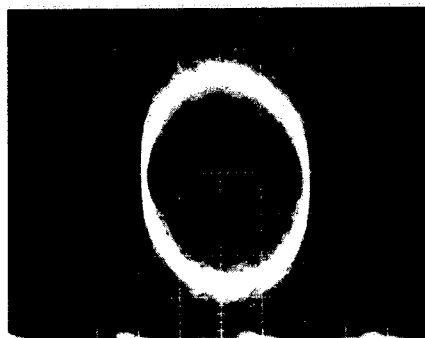


Photo. 9-14 Gain optimum

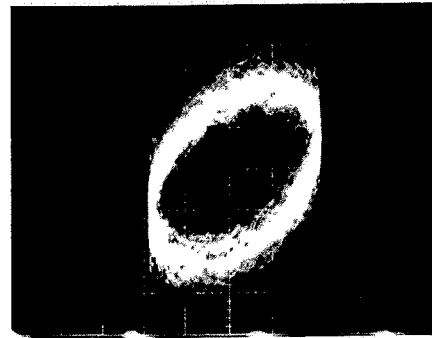
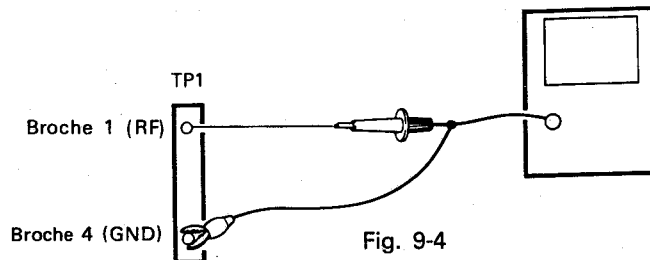


Photo. 9-15 Gain réduit

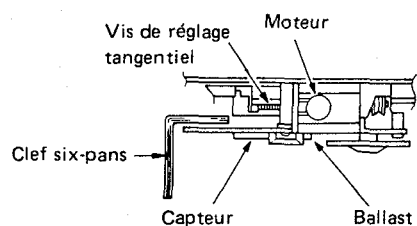
Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
7. RÉGLAGE TANGENTIEL						
		200 ns	TP1 Broche 1 (sortie RF)	Vis de réglage tangentiel	Mire Best Eye	• Mettre en place le disque d'essai (TEST) • Régler le mode d'essai (TEST). (Voir page 39.) • Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) ($\gg$). • Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) ($\gg$), de lecture (PLAY) ($\triangleright$) et de pause (PAUSE) ($\equiv$), et fermer tous les asservissements. (Le voyant de pause s'allume.) • Observer le signal RF à la broche 1 (sortie RF) de TP1 au moyen d'un oscilloscope et régler au moyen de la vis tangentielle, de façon à ce que la mire Best Eye devienne claire. (Figure 9-4) • Le point de réglage se situe au milieu entre le point où la mire se détériore en tournant la vis tangentielle dans le sens des aiguilles d'une montre et le point où la mire se détériore en tournant la vis tangentielle dans le sens inverse des aiguilles d'une montre. Comme critère, observer que la forme d'onde globale soit claire et que l'une des formes de losange se situe dans la mire (Photo 9-6); réaliser le réglage en un point optimum où la forme de losange apparaît avec des traits relativement fins.

Fig. 9-4

Note: Pendant le réglage, tenir la clef six-pans vers le haut de façon à ce que le corps de la tête de lecture ne descende pas.



Note: Pendant le réglage, tenir la clef six-pans vers le haut de façon à ce que le corps de la tête de lecture ne descende pas.



Dans l'illustration ci-dessous, le dessus et le dessous de l'appareil sont en réalité à l'envers.

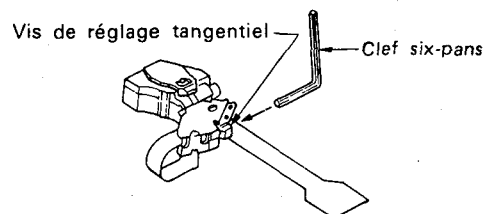


Fig. 9-5 Réglage tangentiel

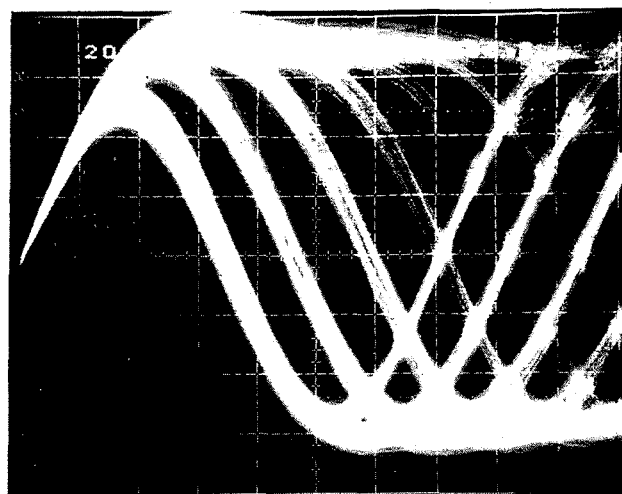
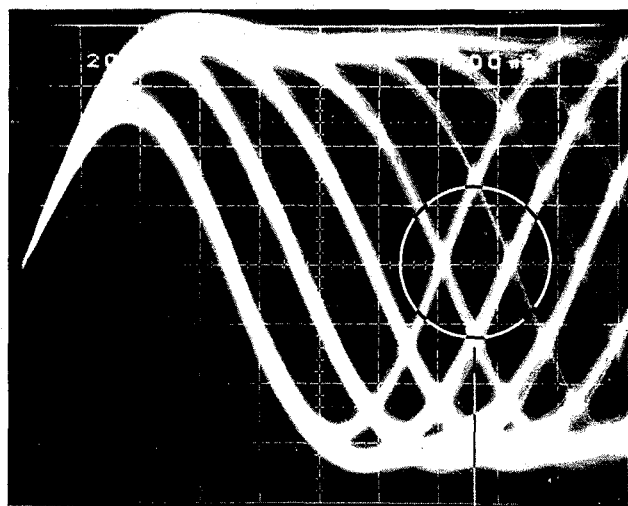


Photo. 9-7



Partie à observer

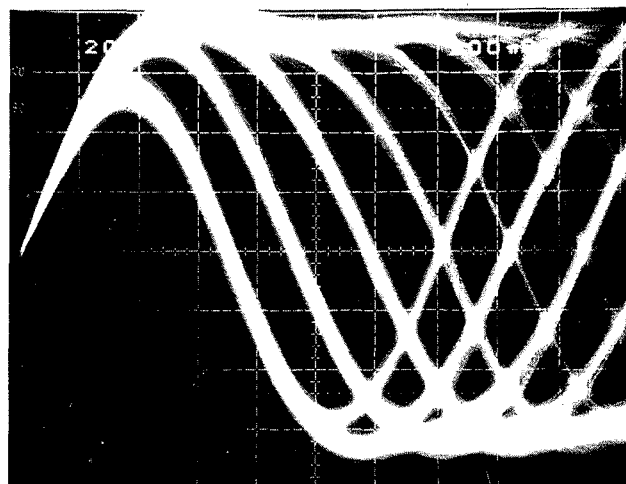


Photo. 9-8

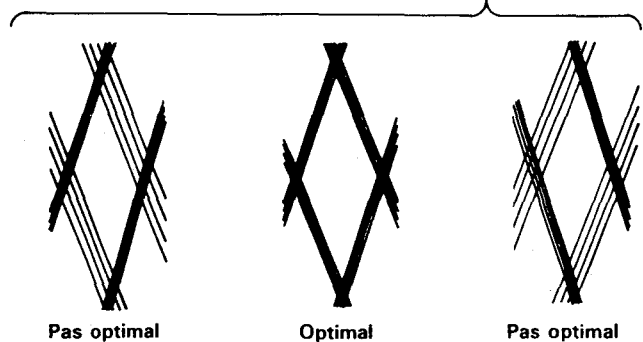


Photo. 9-6

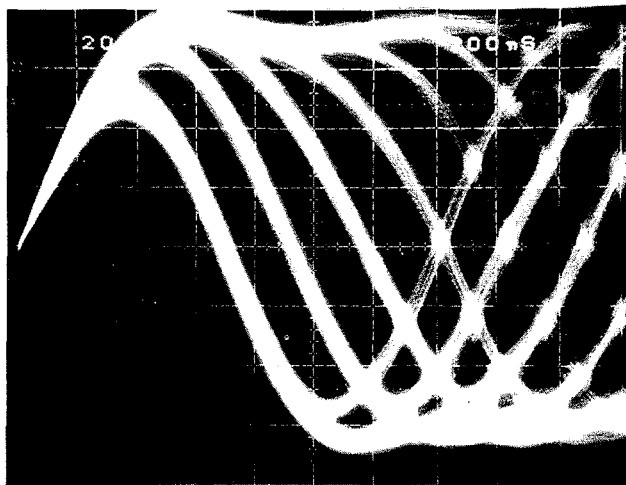
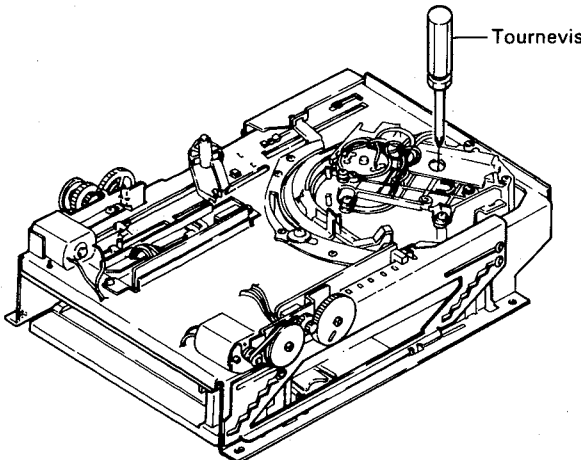
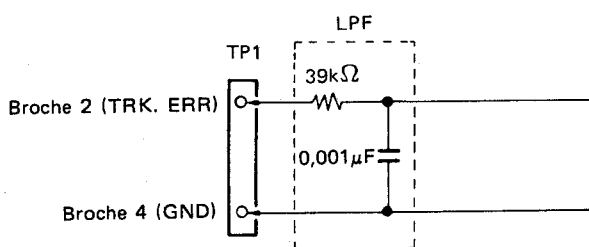


Photo. 9-9

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
1.	REGLAGES DE L'OFFSET DE CENTRAGE DE PISTE, DE L'OFFSET DE FOCALISATION ET DE L'OFFSET RF					
			TP1 broche 2 (TRK.ERR) TP1 BROCHE 6 (FCS.ERR) TP1 BROCHE 1 (RF OUTPUT)	VR5 (TRK.BAL) VR7 (TRK.OFS) VR6 (FCS.OFS) VR2 (RF.OFS)	45° 0V±50 mV Offset de focalisation 0V±50 mV Offset RF 100 mV±50 mV	• Régler le mode d'essai (TEST). (Voir page 39.) • Tourner le potentiomètre VR5 TRK.BAL (équilibrage de centrage de piste) de 45° depuis le centre dans le sens des aiguilles d'une montre. • Ajuster le potentiomètre VR7 TRK.OFS (décalage de centrage de piste) de façon à ce que la tension à la broche 2 TRK.ERR (erreur de centrage de piste) de TP1 devienne égale à 0V±50 mV. • Régler VR6 FCS.OFS (offset de focalisation) de manière à ce que la tension de FCS.ERR (erreur de focalisation) relevée sur la broche 6 de TP1 soit de 0V±50 mV. • Régler VR2 RF.OFS (offset HF) de manière à ce que la tension de RF OUTPUT (sortie HF) relevée sur la broche 1 de TP1 soit de 100 mV±50 mV.
2.	REGLAGE DU NIVEAU RF					
			TP1 Broche 1 (RF)	VR1 Puissance laser	1,5 V _{c-c} +0,2V -0V	• Régler le mode d'essai (TEST). (Voir page 39.) • Reproduire le disque d'essai (TEST) et raccorder la sonde d'un oscilloscope à la broche 1 RF (sortie RF) de TP1 et mesurer la tension C-C de la forme d'onde RF. • Régler la puissance laser de façon que la tension soit de 1,5 V_{c-c}+0,2V -0V.
3.	CONTRÔLE DE LA PUISSANCE DE SORTIE DE LA DIODE LASER (LD)					
					Confirmation: moins de 0,13 mW	• Régler le mode d'essai (TEST). (Voir page 39.) • Appuyer sur la touche de centrage de piste arrière (TRACK FWD) (▷◁) et enclencher la diode laser (LD). • Placer la capteur de l'instrument destiné à mesurer la puissance laser au dessus de l'objectif et vérifier que la puissance de sortie de la diode laser (LD) est inférieure à 0,13 mW.
4.	CONTRÔLE DU VERROUILLAGE DE FOCALISATION ET DU VERROUILLAGE DE MOYEU					
	0,5 V/div.	100 ms/div.	TP1 broche 1 (sortie RF)		Présence de sortie RF Rotation normale	• Mettre en place le disque d'essai (TEST). • Régler le mode d'essai (TEST). (Voir page 39.) • Déplacer la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche [MANUAL SEARCH FWD (▷▷)]. * Cette étape doit absolument être réalisée. • Observer le signal RF à la broche 1 de TP1 (sortie RF) au moyen d'un oscilloscope et vérifier que le signal RF sorte après l'enfoncement de la touche d'avance de piste TRACK FWD (▷◁). • Appuyer sur la touche de lecture (PLAY) (▷) et s'assurer que le disque tourne en sens normal avec approximativement la vitesse spécifiée (étant près du centre du disque, la vitesse de rotation est d'environ 30 tr/mn), sans anomalie ni inversion du sens de rotation.

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
5. RÉGLAGE DE LA MIRE						
	 Fig. 9-2  Fig. 9-3					• Régler le mode d'essai (TEST). (Voir page 39.) • Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (▷), de façon à ce que la vis de réglage du réseau de la tête de lecture puisse être vue à travers le trou oval situé à la partie supérieure de l'asservissement. • Introduire un outil pour réseau dans le trou de réglage depuis la partie supérieure du mécanisme, comme illustré à la figure 9-2, puis vérifier que la vis de réseau tourne. • Appuyer séquentiellement sur les touches de piste avant TRACK FWD (▷) et de lecture (PLAY) (▷), et fermer les asservissements de focalisation et de moyeu. (Ne pas fermer l'asservissement de centrage de piste.) • Observer la forme d'onde à la broche 2 TRK.ERR (erreur de centrage de piste) de TP1 au moyen d'un oscilloscope. Introduire alors un filtre de coupure passe-bas 4 kHz. (Figure 9-3)
0,5 V/div.	5 ms/div.	TP1 Broche 2 TRK.ERR	Réseau Réseau	Point zéro Amplitude maximum	• Faire tourner un outil de réseau et rechercher le point zéro. (Photo 9-1) • Tourner ensuite lentement dans le sens contraire des aiguilles d'une montre l'outil de réseau depuis le point zéro et l'ajuster sur le point où la forme d'onde (signal d'erreur de centrage de piste) présente une première amplitude maximum. (Voir photo 9-3.) Note: Si l'outil de réseau est appuyé avec force, la tête de lecture se déplace vers le centre du disque et le réglage devient difficile à effectuer. • Finalement, s'assurer que le signal d'erreur de centrage de piste (cette fois-ci le filtre de coupure passe-bas à 4 kHz n'est pas introduit) n'a pas beaucoup varié lorsque la tête de lecture est déplacée vers le centre du disque, et aussi que la tension C-C du signal de centrage de piste n'a pas non plus beaucoup varié sur la circonférence extérieure du disque. Lorsque le niveau varie de plus de ±10%, recommencer le réglage en tournant la vis de réseau jusqu'au point d'amplitude d'erreur maximum.	

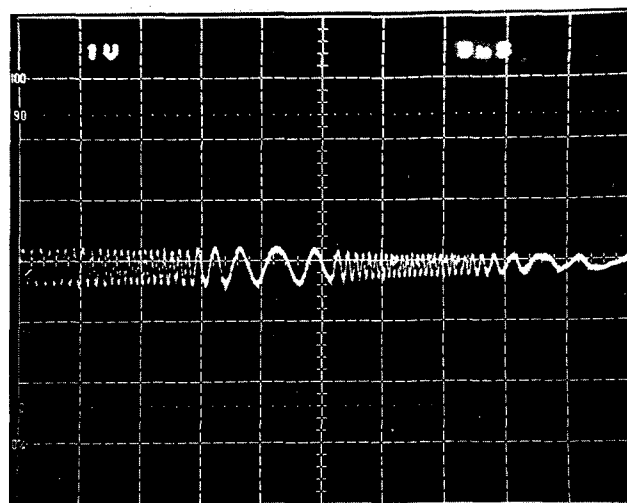


Photo. 9-1 Point zéro

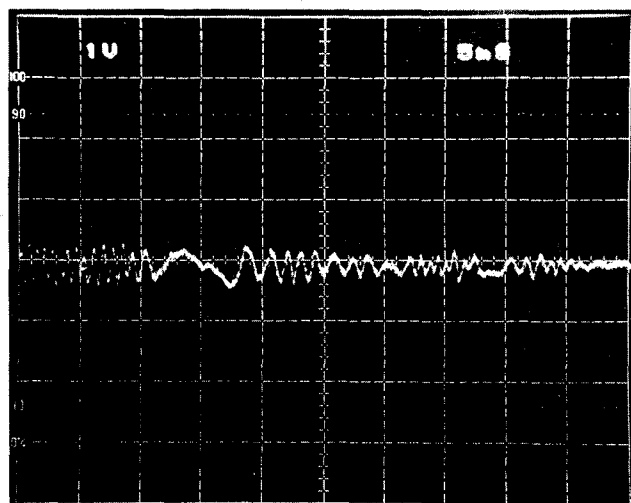


Photo. 9-2 Forme d'onde hors du point zéro

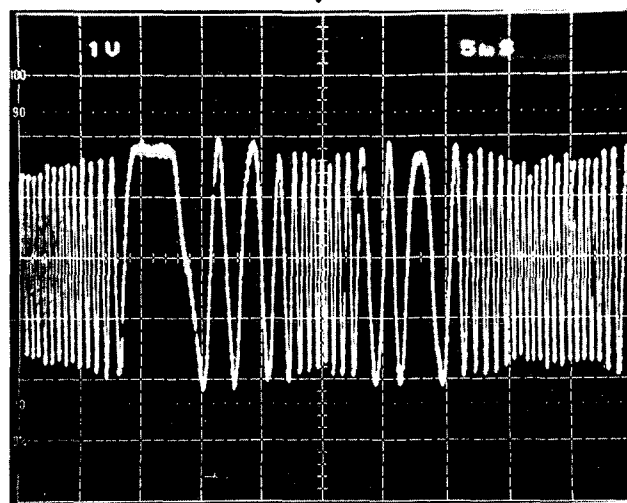


Photo. 9-3 Amplitude maximum

Photo. 9-4 Présence de la composante continue

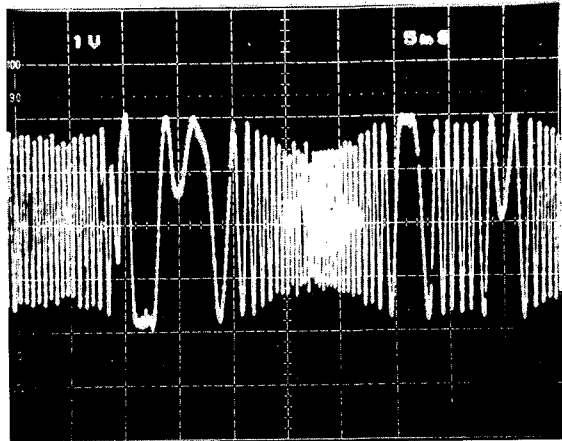


Photo. 9-5 Absence de la composante continue

9. RÉGLAGES

Les réglages pour ce modèle doivent être réalisés dans l'ordre indiqué ci-dessous.

• Réglages et vérifications à effectuer

1. Réglages de l'offset de centrage de piste, de l'offset de focalisation et de l'offset RF.
2. Réglage du niveau RF
3. Vérification de la puissance de sortie de la diode laser (LD)
4. Vérification du verrouillage de focalisation et du verrouillage de moyeu
5. Réglage du réseau
6. Réglage de l'équilibrage de centrage de piste
7. Réglage tangentiel
8. Réglage du gain de focalisation
9. Réglage du gain de centrage de piste
10. Réglage de la fréquence propre du VCO
11. Méthode de contrôle de la caractéristique S (erreur de focalisation)

• Matériel de mesure

1. Oscilloscope double trace
2. Appareil de mesure pour puissance laser
3. Disque d'essai (YEDS7)
4. Filtre de réglage pour équilibrage de centrage de piste
5. Filtre de réglage pour gain de boucle
6. Générateur de signal
7. Fréquencemètre
8. Outillage général divers

• Mode d'essai

Tous les réglages doivent être réalisés dans le mode d'essai (Test Mode).

Méthodes de réglage et d'annulation du mode d'essai

- (1) Pour régler le mode d'essai, placer l'interrupteur d'alimentation (POWER) du lecteur (S401) sur la position de marche (ON) en appuyant sur l'interrupteur de mode d'essai (TEST MODE SWITCH) (S1).
- (2) Pour annuler le mode d'essai, amener simplement l'interrupteur d'alimentation (POWER) du lecteur sur la position d'arrêt (OFF).

Les différentes fonctions des touches dans le mode d'essai sont indiquées dans le tableau 9-1.

• Points de réglage

- VR1: Puissance laser
 VR7: Décalage de centrage de piste (TRK.OFS)
 VR3: Gain de focalisation (FCS.GAN)
 VR4: Gain de centrage de piste (TRK.GAN)
 VR5: Équilibrage de centrage de piste (TRK.BAL)
 VR6: Décalage de focalisation (FCS.OFS)
 VR8: Réglage du VCO (VCO.ADJ)
 VR2: Offset RF (RF.OFS)

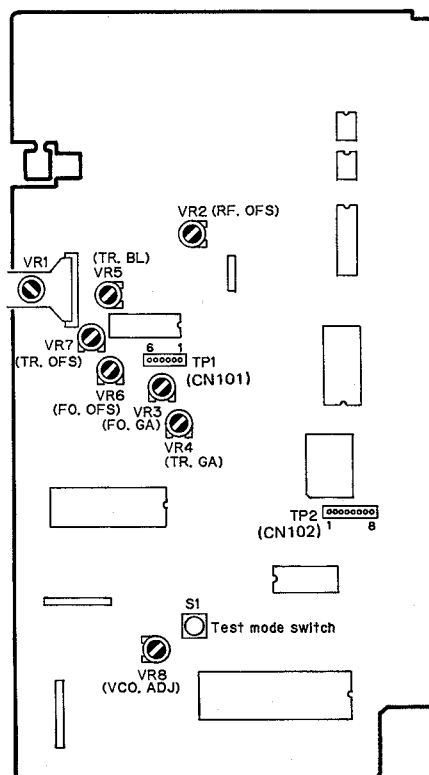


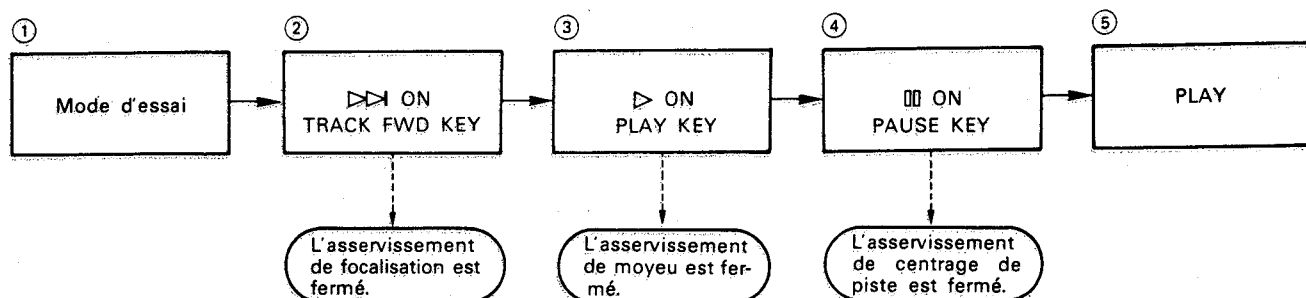
Fig. 9-1 Point de réglage

Dans le mode d'essai (Test Mode), chaque circuit asservi peut être fermé ou ouvert au moyen d'opérations séparées. En conséquence, les asservissements doivent être fermés l'un après l'autre (séquentiellement) pour régler le mode de lecture (PLAY).

Note: Le mode de lecture (PLAY) n'est pas simplement mis en oeuvre par l'enfoncement de la touche PAUSE () dans le mode d'essai.

Exemple: Commutation du mode d'arrêt (STOP) au mode de lecture (PLAY).

* Dans le mode d'essai (Test Mode), chaque servo-mécanisme agit séquentiellement.



• Fonction des touches dans le mode d'essai (Test Mode)

Symbole	Désignation de touche	Fonction pendant le mode d'essai	Description
	TRACK FWD	Asservissement de focalisation fermé	La diode laser s'allume. Le moteur d'asservissement se déplace vers le haut/bas, puis l'asservissement de focalisation est fermé.
	PLAY	Asservissement de moyeu fermé	Le moyeu commence à tourner et l'asservissement est fermé lorsqu'il passe dans le mode CLV-A.
	PAUSE	Asservissement de centrage de piste ouvert/fermé	Réalise l'opération de bascule. Fermeture de l'asservissement de centrage de piste et passage en mode de lecture (PLAY) en appuyant sur la touche (l'asservissement de focalisation et l'asservissement de moyeu doivent se fermer); le voyant de PAUSE s'allume. L'asservissement de centrage de piste s'ouvre par une nouvelle pression sur la touche.
	MANUAL SEARCH REV	Le chariot se déplace en arrière (vers le centre du disque).	Le chariot se déplace vers le centre du disque à une vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
	MANUAL SEARCH FWD	Le chariot se déplace en avant (vers le centre du disque).	Le chariot se déplace vers la fin du disque à la vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
	STOP	Arrêt	Tous les asservissements sont ouverts
	EJECT	Ejection du magasin de disque compact	Le magasin du disque compact est éjecté. Néanmoins, la tête de lecture ne revient pas sur sa position de repos. De plus, même lorsque le disque est enfermé, la tête de lecture demeure tel quel.

Tableau 9-1

10. FOR HB AND SD TYPES

10.1 CONTRAST OF MISCELLANEOUS PARTS

NOTES:

Parts without part number cannot be supplied.

The $\triangle$ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

- For your parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.

$\star\star$ GENERALLY MOVES FASTER THAN $\star$

This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

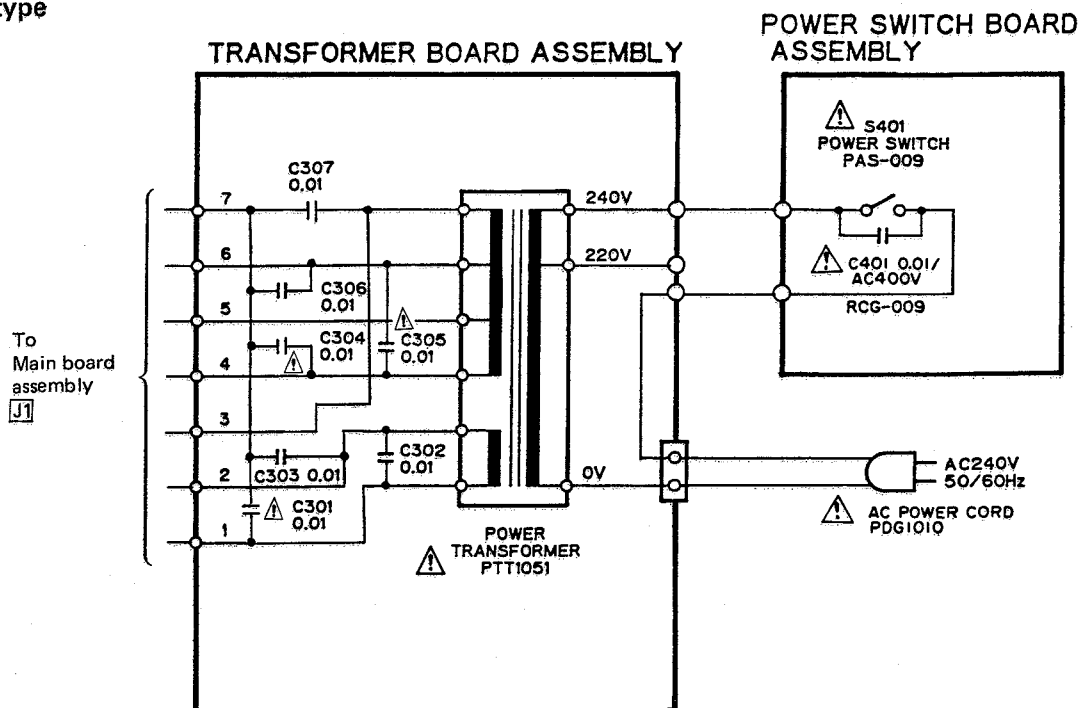
Shipment is made with the caution card affixed to the glass door.

The PD-Z81M/HB and SD types are the same as the PD-Z81M/HEM type with the exception of the following sections.

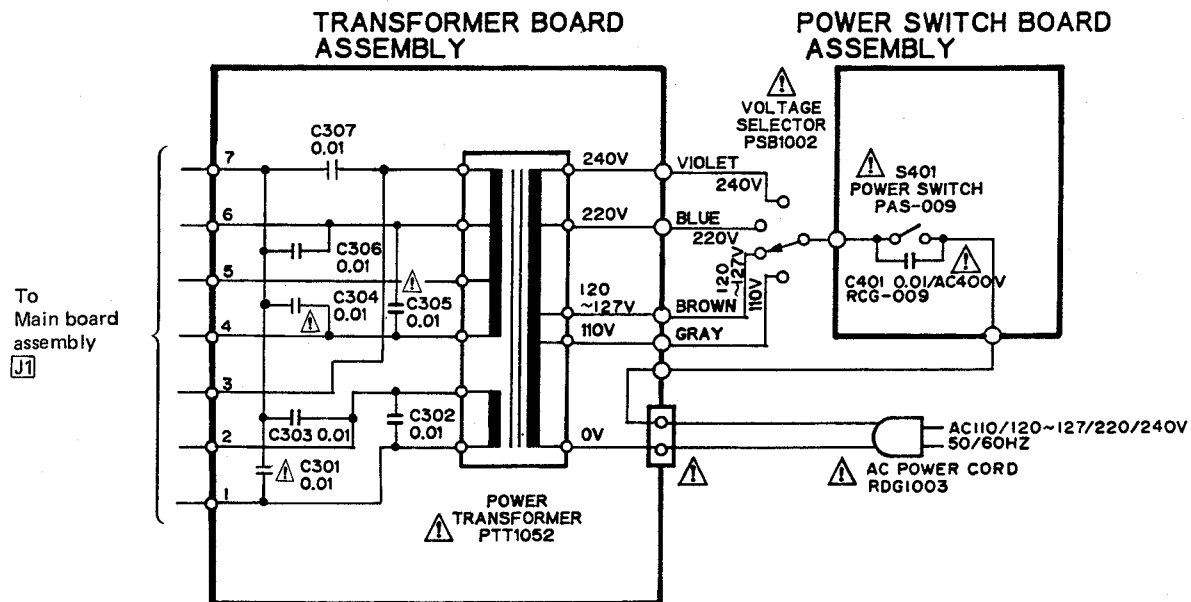
Mark	Symbol & Description	Part No.			Remarks
		PD-Z81M/HEM	PD-Z81M/HB	PD-Z81M/SD	
$\triangle$	AC power cord	PDG1008	PDG1010	RDG1003	
$\triangle$ $\star\star$	Line voltage selector (110/120 ~ 127/220/240V)	...	...	PSB1002	
$\triangle$ $\star$	Power transformer (AC 220/240V)	PTT1051	PTT1051	...	
$\triangle$ $\star$	Power transformer (AC110/120 ~ 127/220/240V)	...	...	PTT1052	
	Operating instructions (English/French/Spanish/German/Italian/ Swedish/Dutch/Portuguese)	PRE1042	...	...	
	Operating instructions (English)	...	PRB1040	PRB1040	
	Operating instructions (Spanish)	...	...	PRC1005	

10.2 SCHEMATIC DIAGRAM

- For HB type



- For SD type



Line Voltage Selection (for HEM and HB types)

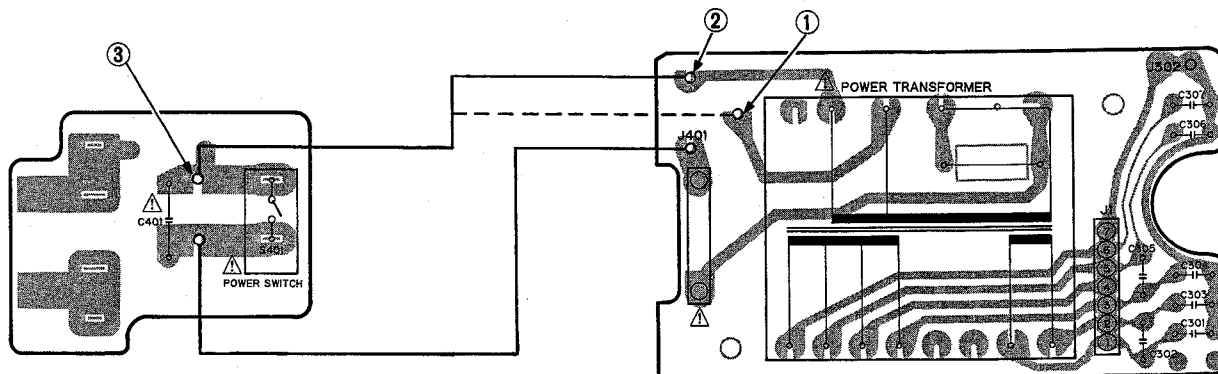
- Line voltage can be changed with the following steps.

1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection wire from Power switch board assembly (Terminal NO. ③) to Transformer board assembly (Terminal NO. ① or ②) as follows.

Voltage	Terminal NO. of Transformer board assembly
220V	①
240V	②

4. Stick the line voltage label on the rear panel.

Part NO.	Description
AAX-193	220V label
AAX-192	240V label



Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
9	TRACKING GAIN ADJUSTMENT					
	50 mV/div.5mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)	X axis TP1 Pin 3 (TRK.IN) Y axis TP1 Pin 2 (TRK.ERR)	VR4 (TRK.GAN)	Phase difference 90°	• In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 9-7. • Set to TEST mode. (See page 28.) • Press TRACK FWD key (▷◁), PLAY key (▷) and PAUSE key (⏏) sequentially, and turn ON the each servos of focus, spindle and tracking. Turn the POWER of oscillator ON and output 1.2 kHz 2 Vp-p. Note: (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.) • Adjust with VR4 TRK GAN (Tracking gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (phase difference 90°).	

The diagram illustrates the test setup for tracking gain adjustment. It shows a circuit with the following components and connections:

- TP1** is connected to **Pin 3 (TRK. IN)** via a $100k\Omega$ resistor.
- Pin 3 (TRK. IN)** is connected to **Pin 4 (GND)** via a $39k\Omega$ resistor.
- Pin 4 (GND)** is connected to **Pin 2 (TRK. ERR)** via a $0.001\mu F$ capacitor.
- An **OSC** (oscillator) is connected to **Pin 3 (TRK. IN)** via a $10:1$ probe. The oscillator output is **1.2kHz** and **2 Vp-p**.
- Pin 2 (TRK. ERR)** is connected to the **Y** input of the oscilloscope via a $10:1$ probe.
- The **X** input of the oscilloscope is connected to **TP1** via a $10:1$ probe.
- The oscilloscope is shown displaying a horizontal circle, indicating a phase difference of 90° .

Fig. 9-7

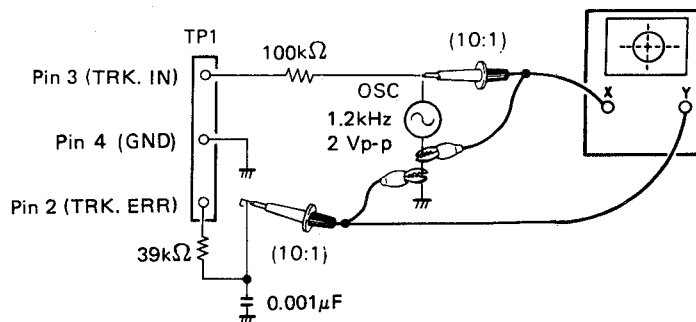


Fig. 9-7

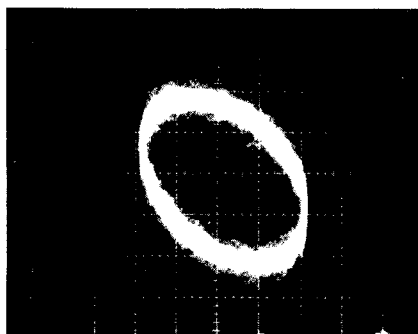


Photo. 9-13 High gain



Photo. 9-14 Optimum gain

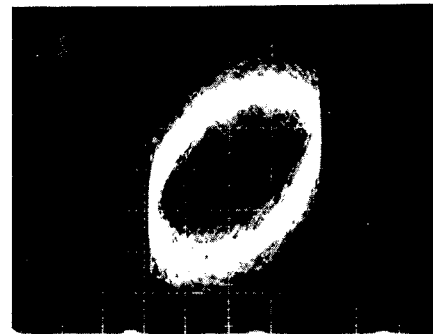
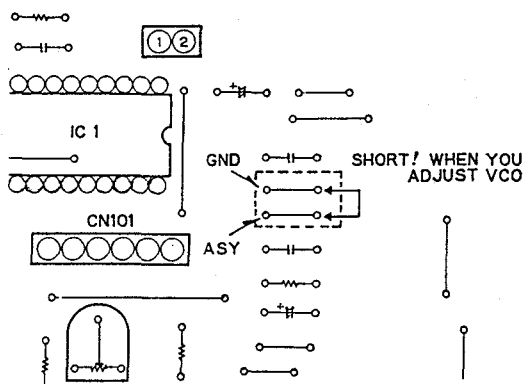
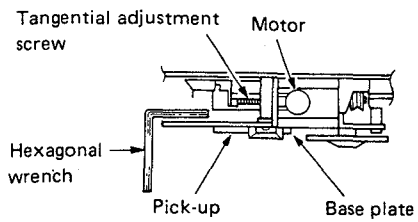


Photo. 9-15 Low gain

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
10	VCO FREE RUN FREQUENCY ADJUSTMENT					• Set to TEST mode. (See page 28.) • Short-circuit between ASY and GND jumper with grating driver, etc. (Fig. 9-8) • Connect frequency counter, which is measurable over 10 MHz, to pin 2 of TP2. • Adjust with VR8.VCO ADJ (VCO adjustment) volume so that the value of frequency counter becomes 4.375 ± 0.025 MHz.  Fig. 9-8
11	METHOD TO CONFIRM S CHARACTER (FOCUS ERROR)					• Set to TEST mode. (See page 28.) • Short-circuit between pin 5 FCS. IN (Focus in) of TP1 and GND. • Press TRACK FWD key (▶▶) and observe the waveform of pin 6 FCS.ERR (Focus error) of TP1 at that time with an oscilloscope.



In the figure below, the top and bottom is opposite to that of the actual product.

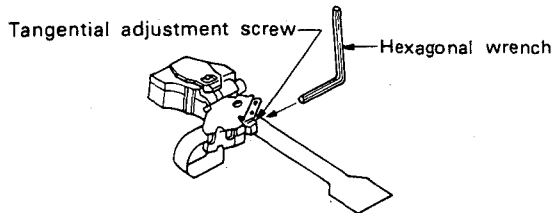


Fig. 9-5 Tangential adjustment

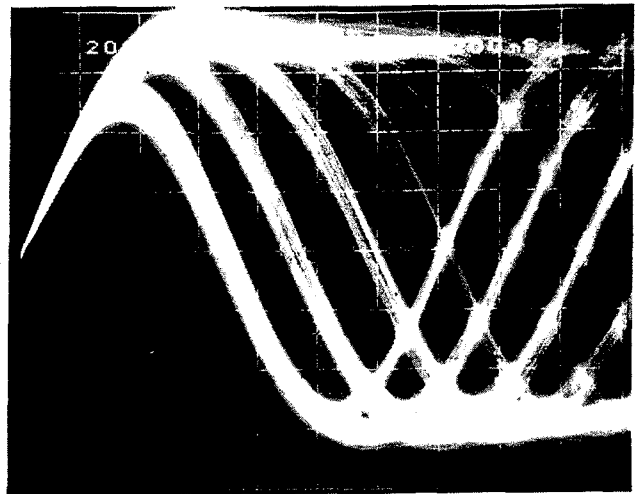
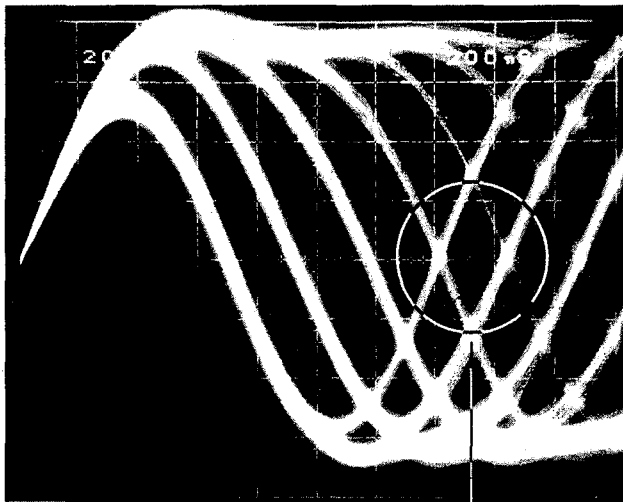


Photo. 9-7



Part to be observed

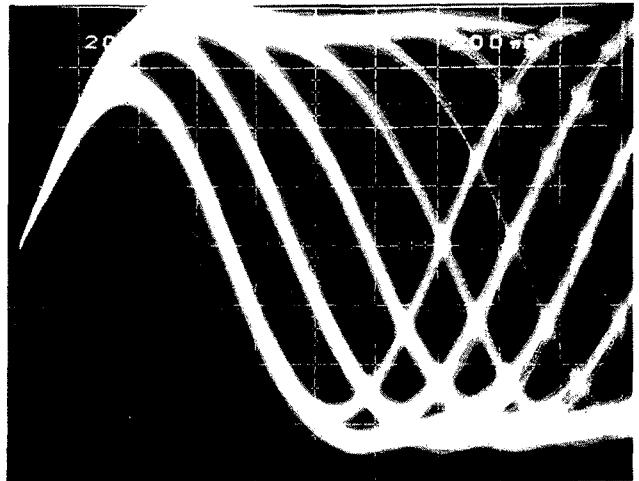


Photo. 9-8

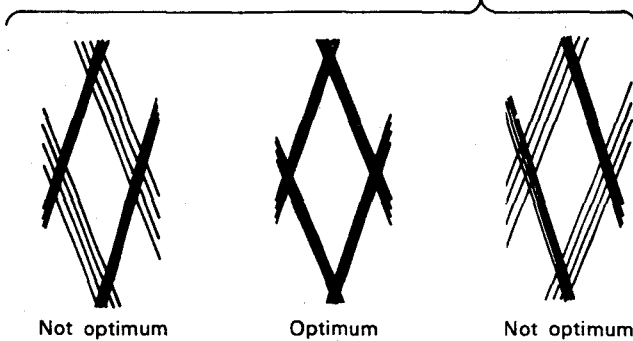


Photo. 9-6

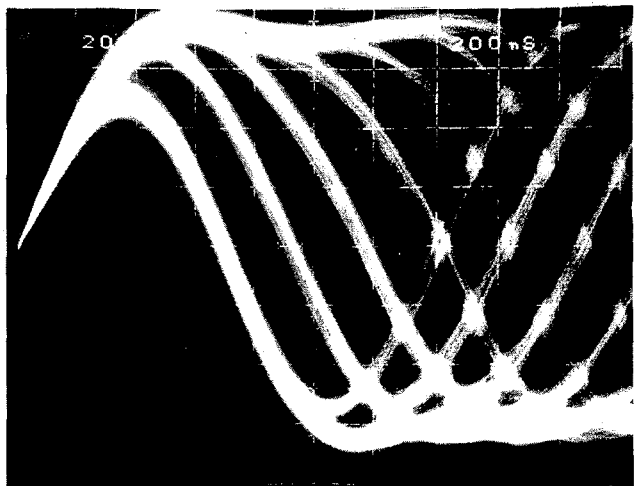


Photo. 9-9

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
8	FOCUS GAIN ADJUSTMENT					
	20mV/div.5/mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)	X axis TP1 Pin 5 (FCS.IN) Y axis TP1 Pin 6 (FCS.ERR)	VR3 (FCS.GAN)	Phase difference 90°	• In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 9-6. • Set to TEST mode. (See page 28.) • Press TRACK FWD key (▶▶), PLAY key (▶) and PAUSE key (⏏) sequentially, and turn ON the each servos of focus, spindle and tracking. • Turn the POWER of oscillator ON and output 1.2 kHz 1 Vp-p. Note: (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.) • Adjust with VR3 FCS.GAN (Focus gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (Phase difference 90°).	

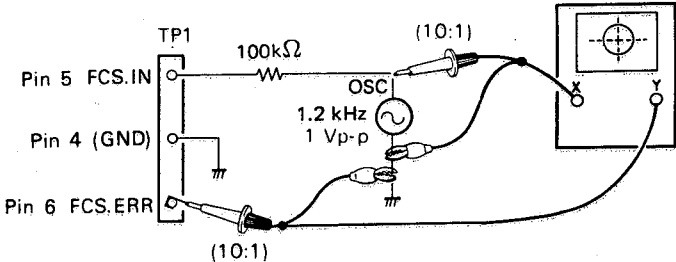


Fig. 9-6

Fig. 9-6

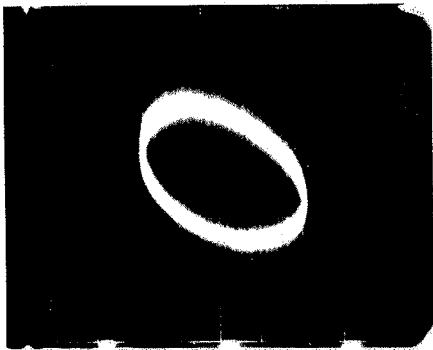


Photo. 9-10 High gain

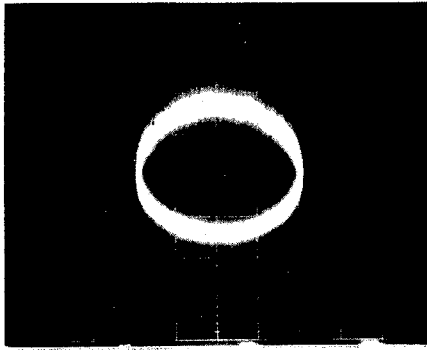


Photo. 9-11 Optimum gain

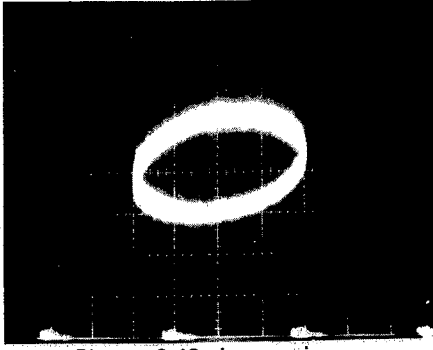
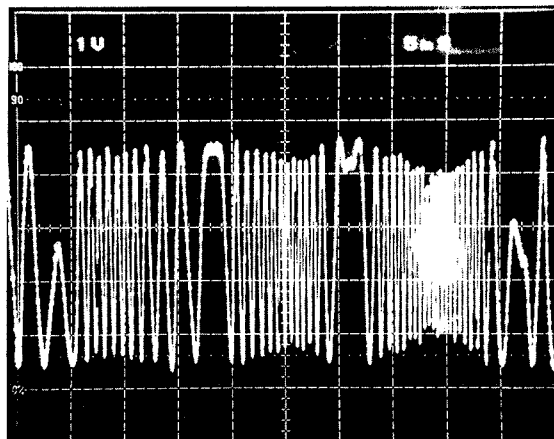
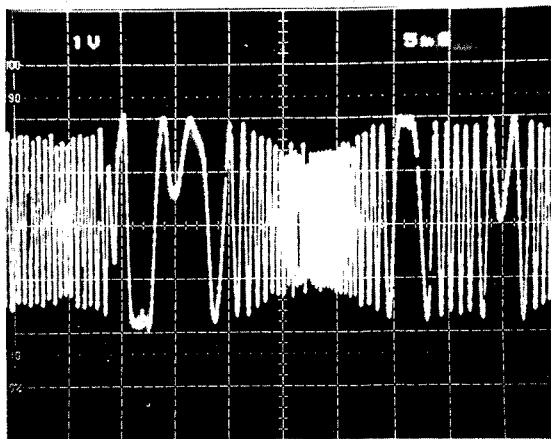


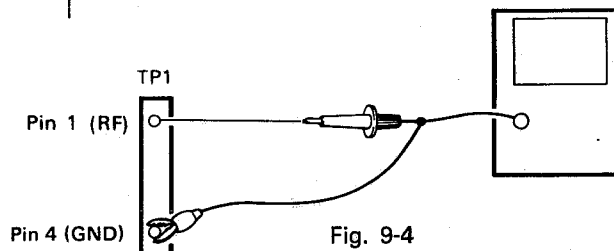
Photo. 9-12 Low gain

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
6 TRACKING BALANCE ADJUSTMENT						
	0.5V/div	5 msec /div	TP1 Pin 2 (TRK.ERR)	VR5 (TRK.BAL)	(TRK.ERR)	• Set the TEST disc. • Set to TEST mode. (See page 28.) • Shift the carriage close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷). • Press TRACK FWD key (▷▷), and PLAY key (▷) to start turning the disc. • Observe pin 2 TRK.ERR (Tracking error) of TP1 with an oscilloscope and adjust with VR5 TRK.BAL (Tracking balance) volume so that the DC component of the tracking error disappears. Note: When this adjustment is performed, be sure to always perform tracking error offset adjustment.
 						
Photo. 9-4 DC component exists Photo. 9-5 DC component not exist						

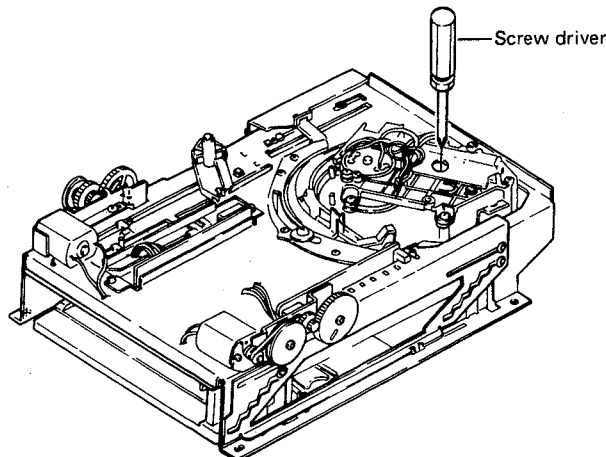
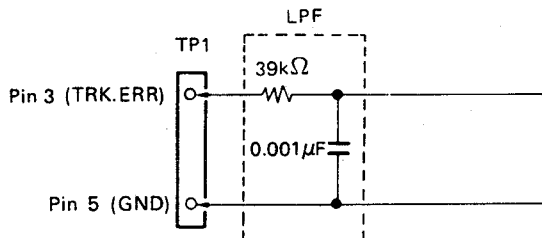
Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
7	TANGENTIAL ADJUSTMENT					
		200nS	TP1 Pin 1 (RF output)	Tangential adjustment screw	Best eye pattern	• Set the TEST disc. • Set to TEST mode. (See page 28.) • Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷). • Press TRACK FWD key (▷▷), PLAY key (▷) and PAUSE key (⏏) sequentially, and close all the servos. (Pause indicator lights up.) • Observe pin 1 RF (RF output) of TP1 with an oscilloscope and adjust with the tangential screw so that the eye pattern becomes clear. (Fig. 9-4) • The adjusting point is the middle point between the point where the eye pattern becomes deteriorate by turning the tangential screw clockwise and the point where the eye pattern becomes deteriorate by turning the tangential screw counterclockwise. As a criterion, observe that the overall waveform is clear and one of the diamond shapes within the eye pattern (Photo. 9-6), and adjust at as an optimum point where the diamond shape is seen relatively fine line.

Fig. 9-4

Note: During the adjustment, hold hexagonal wrench to upward so as to keep the pickup body not goes down.



Note: During the adjustment, hold hexagonal wrench to upward so as to keep the pickup body not goes down.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
5	GRATING ADJUSTMENT					
	 Fig. 9-2  Fig. 9-3					• Set to TEST mode. (See page 28.) • Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷) so that the grating adjustment screw of the pickup can be seen through the oval hole of the upper side of the servo mechanism. • Insert a grating driver into the adjusting hole from the upper side of the mechanism as shown in Fig. 9-2, and confirm that the grating screw turns. • Press TRACK FWD key (▷◁) and PLAY key (▷) sequentially and close the focus servo and spindle servo. (Do not close the tracking servo.) • Observe the waveform of pin 2 TRK.ERR (Tracking error) of TP1 with an oscilloscope. At this point, insert a 4 kHz cutoff low-pass filter. (Fig. 9-3)
0.5V/div	5 ms/div	TP1 Pin 2 TRK.ERR	Grating Grating	Null point Maximum amplitude	• Turn a grating driver and find null point. (Photo. 9-1) • Then, turn slowly the grating driver counter clockwise from the null point and adjust at the point where the waveform (Tracking error signal) firstly becomes maximum amplitude. (See Photo. 9-3.) Note: If the grating driver is pressed strongly, the pickup moves toward disc center, accordingly adjustment becomes difficult. • Finally, be sure to confirm that the tracking error signal (at this time, 4 kHz of cutoff low-pass filter is not inserted) when the pickup is moved toward the disc center and the P-P voltage of the tracking error signal at the outer circumference of the disc are not varied greatly. When the level is deviated over ±10%, adjust again by turning grating screw to the maximum error amplitude point.	

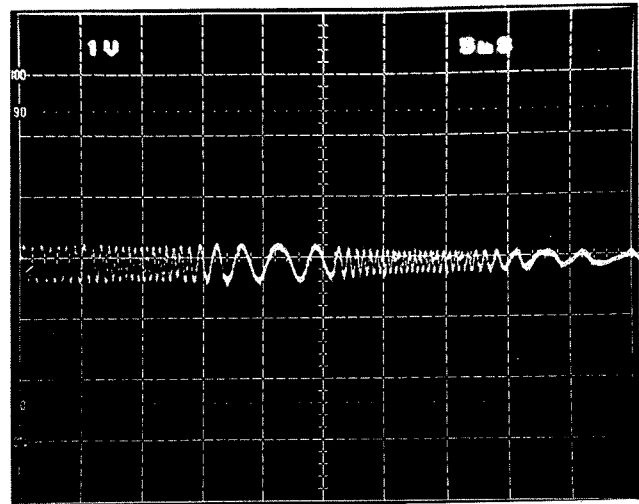


Photo. 9-1 Null point

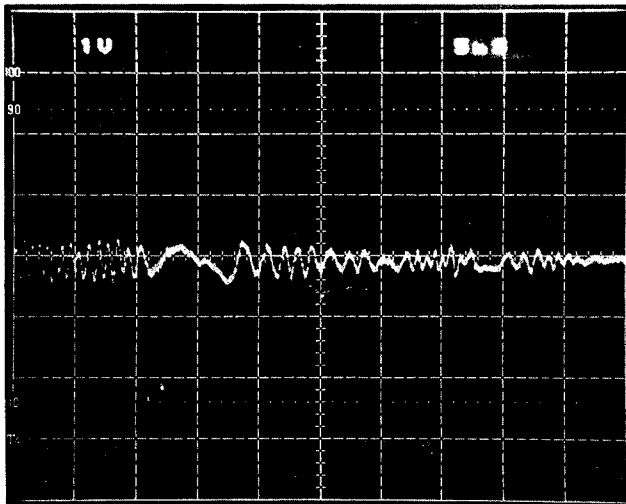


Photo. 9-2 Waveform of not null point

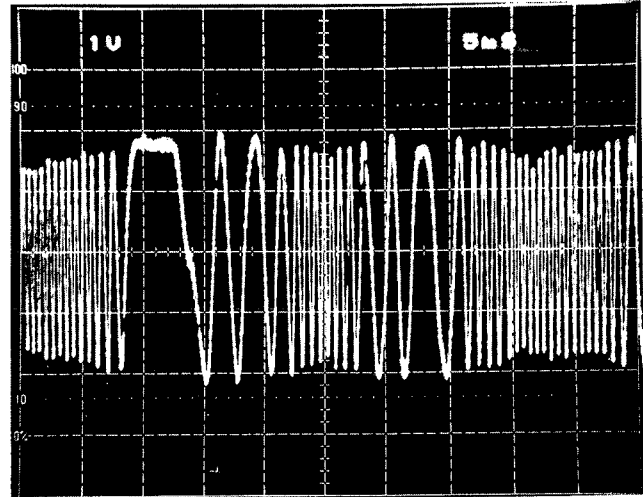
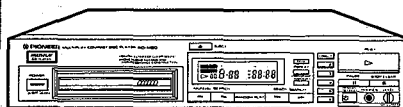


Photo. 9-3 Maximum amplitude

Service Manual



SERVICE GUIDE
ORDER NO.
ARP1369

MULTI-PLAY COMPACT DISC PLAYER

PD-M50

PD-M40

PD-M40-S

- For the service manual of the models which has been described in service guide, refer to the service manual (ARP1342) of PD-M50/KU, KC, HEM, HB, SD, SD/G, PD-M40/KU, KC, HEM, HP, SD and PD-M40-S/HEM.

CONTENTS

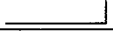
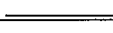
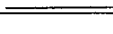
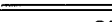
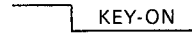
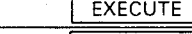
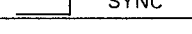
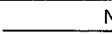
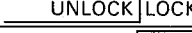
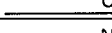
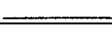
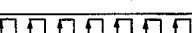
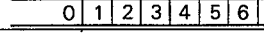
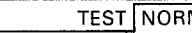
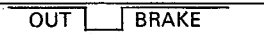
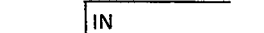
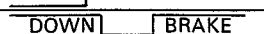
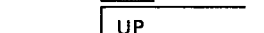
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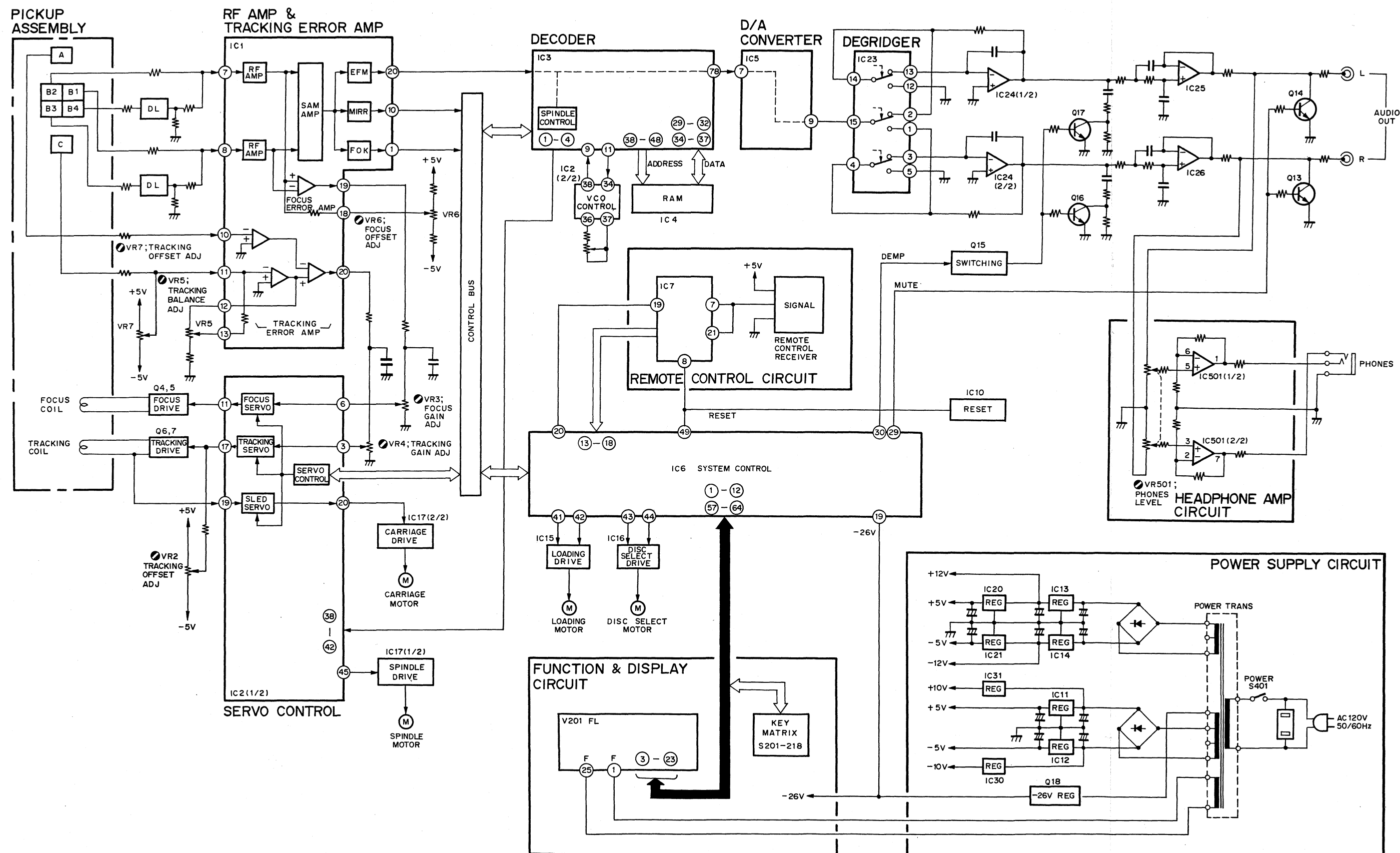
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1. IC DESCRIPTIONS

Pin Description (PD3095)

Pin No.	Port	Name	I/O	Function	Initial level
1	D11	DIG4	O	Key display matrix digit output 	L
2	D12	DIG5	O	Key display matrix digit output 	L
3	D13	DIG6	O	Key display matrix digit output 	L
4	D14	DIG7	O	Key display matrix digit output 	L
5	D15	SEGH	O	Segment indication data output (h) 	L
6	R00	SEGA	O	Segment indication data output (a) 	L
7	R01	SEGB	O	Segment indication data output (b) 	L
8	R02	SEGC	O	Segment indication data output (c) 	L
9	R03	SEGd	O	Segment indication data output (d) 	L
10	R10	SEGe	O	Segment indication data output (e) 	L
11	R11	SEGf	O	Segment indication data output (f) 	L
12	R12	SEGg	O	Segment indication data output (g) 	L
13	R13	RK4	I	Remote control key code input	—
14	R20	RK5	I	Remote control key code input (MSB)	—
15	R21	RK3	I	Remote control key code input	—
16	R22	RK2	I	Remote control key code input	—
17	R23	RK1	I	Remote control key code input	—
18	RA0	RK0	I	Remote control key code input (LSB)	—
19	Vdisp	—	—	—26V	—
20	R30	RKS	I	Remote control key strobe input 	—
21	R31	XLT	O	LSI control data executing pulse output 	H
22	INT0	SCOR	I	Sub-code sync input 	—
23	R33	SENS	I	LSI operating mode multi-mode input	—
24	R50	CRCF	I	Sub-code Q-CRC checking result input 	—
25	R51	GFS	I	Frame sync lock input 	—
26	R52	ATTE	I	ATT function on/off selection input 	—
27	R53	FOK	I	In-focus input 	—
28	R60	LDON	O	Laser diode on/off output 	H
29	R61	MUTE	O	Muting on/off output 	H
30	R62	DEMP	O	De-emphasis on/off output 	H
31	R63	CLVH	O	Spindle CLV-H output 	L
32	Vcc	—	—	+5V	—
33	SCK	CLK	O	Serial transfer clock 	H
34	SI	SUBQ	I	Sub-code Q data input 	—
35	SO	DATA	O	LSI control data serial output	H
36	R43	TEST	I	Test mode selection input 	—
37	R70	ALAT	O	ATT level data latch pulse output 	H
38	R71	ADAT	O	ATT level data serial output 	H
39	R72	ACLK	O	ATT level data serial transfer clock 	H
40	R73	Unused	O	(Open)	L
41	R80	LIN	O	Disc loading 	H
42	R81	LOUT	O	in/out output 	H
43	R82	DSUP	O	Disc selector 	H
44	R83	DSDW	O	up/down output 	H

2. BLOCK DIAGRAM



3. CIRCUIT DESCRIPTIONS

3.1 ACCURATE FOCUS SERVO SYSTEM

As a method (the Accurate Focus System) for reducing the distortion of RF signals read by the pickup, delays have been applied to the output of 2 photodiodes that precede the quarter photodiodes and is followed by an addition operation in order to achieve improvements in frequency response, distortion, S/N and so on as well as to increase the accuracy of signal reading.

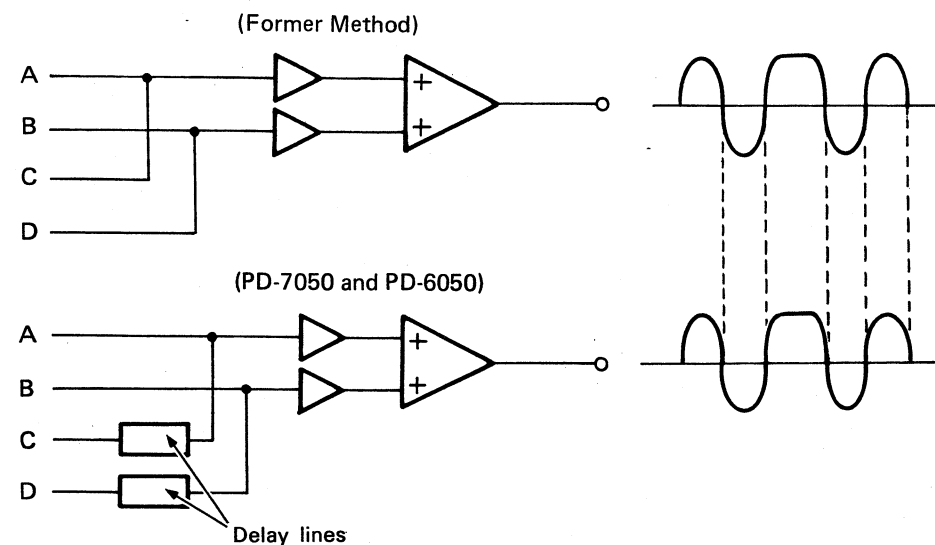
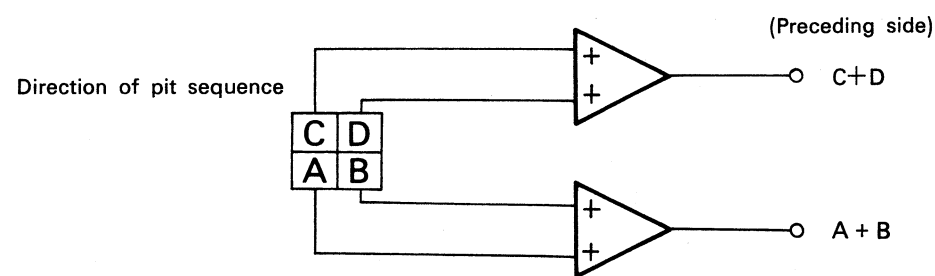


Fig. 3-1

3.2 IC DESCRIPTION

3.2.1 CXA1082AS

FOCUS SERVO SYSTEM

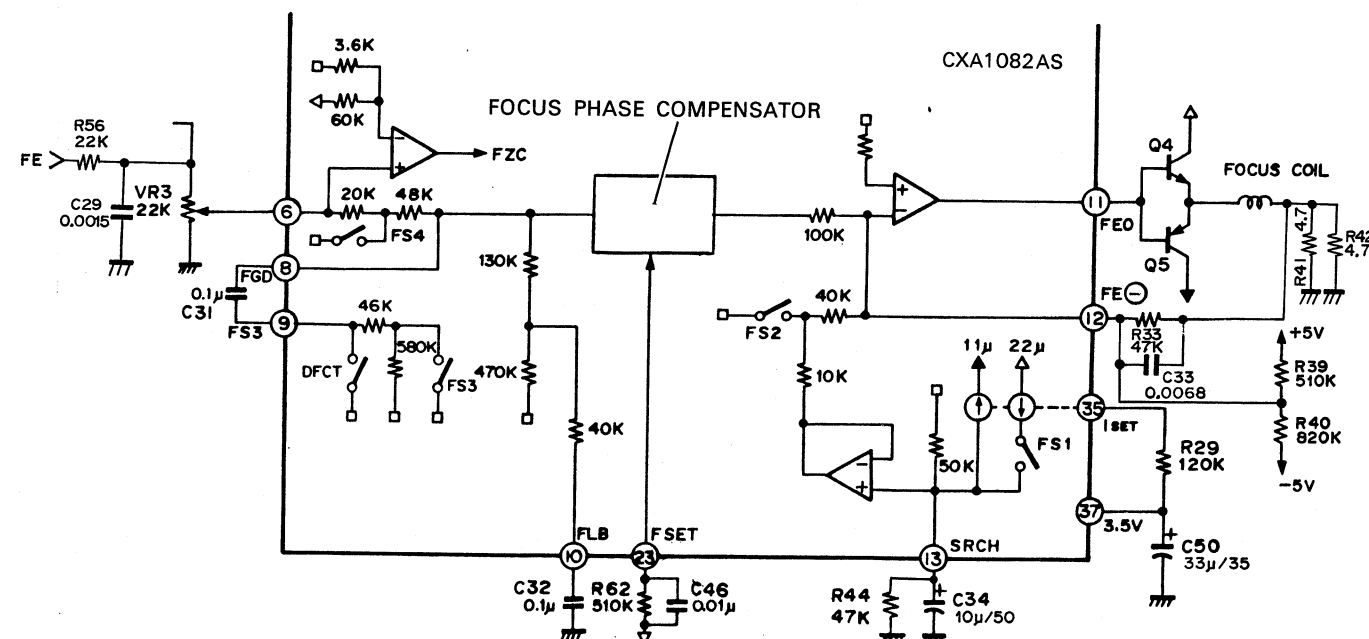


Fig. 3-2

The above figure is a block diagram of the Focus Servo System (Fig. 3-2).

When FS3 is ON, the high-cut filter gain that formed the low-range time constant can be dropped by the operation of the capacitor connected between Pins 8 and 9 as well as the internal resistor.

The capacitor between Pin 10 and GND is a time constant that boost the low-range frequency during normal play mode.

The peak frequency of the Focus Phase Compensator is in inverse proportion to the value of the resistor connected to Pin 23, and its peak value is approximately 1.2 kHz in case of 510 k Ω resistance value.

The height of the focus search operation is approximately ± 1.1 Vp-p in case of the time constants shown in the Fig. 3-2. This height is in inverse pro-

portion to the value of the resistor connected between Pins 35 and 36.

This system is set to a value that is 5.7% of difference between the reference voltage V_{cc} for the inverted input of the FZC comparator and VC (Pin 1); that is, it is set to $(V_{cc} - VC) \times 5.7\%$.

NOTE: When the value of the resistor connected to Pin 23 is changed, changes will also concurrently occur in the peak values of the phase-compensating peak value Focus Servo and Tracking and Carriage Servo systems as well as in the f_c value of CVL LPF. In addition, the dynamic range and offset voltage of the OP Amp will also be concurrently changed.

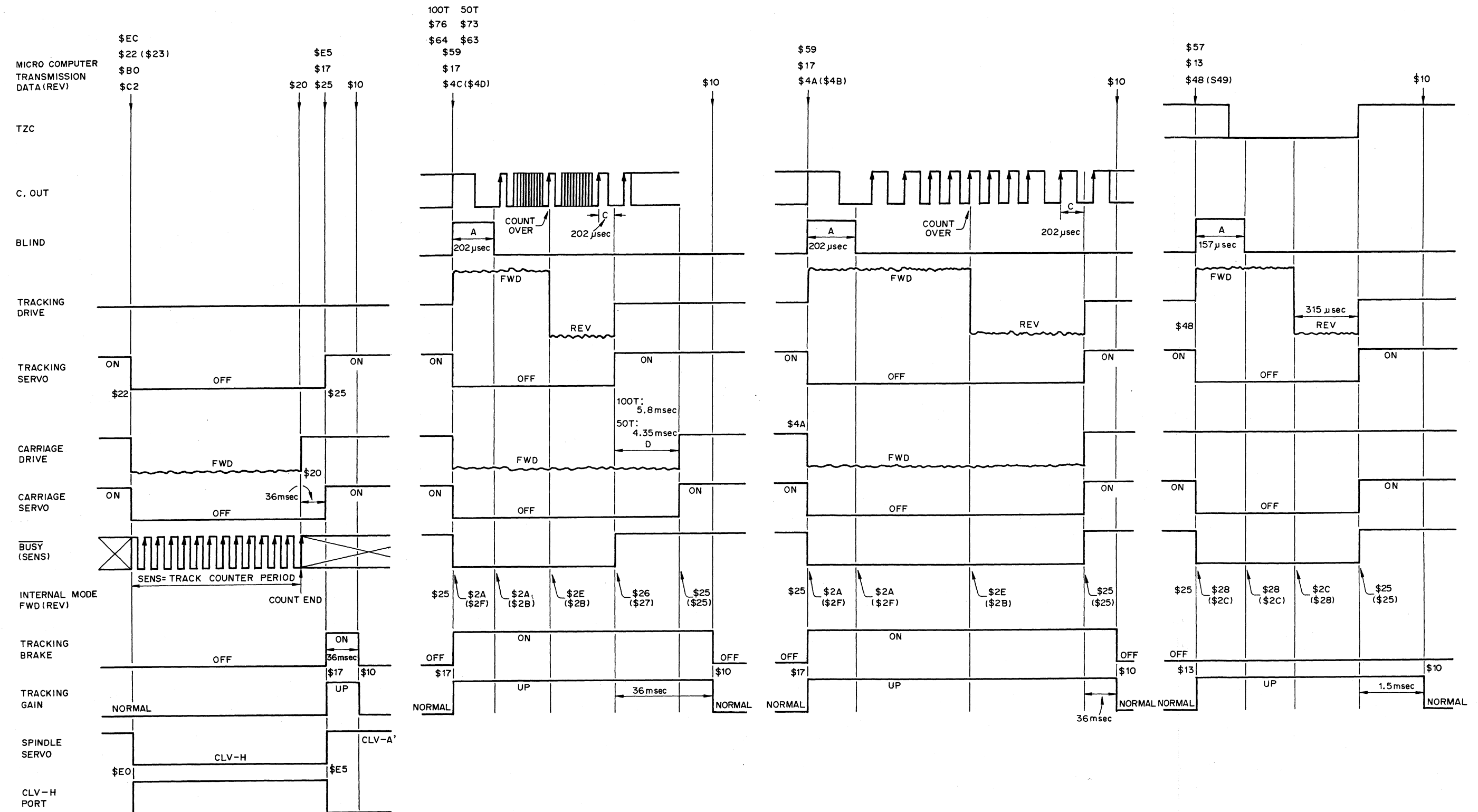
SEARCH Mode Access Operation Timing Chart

TRACK · COUNT · SEARCH

100/50 - TRACK JUMP

10 - TRACK JUMP

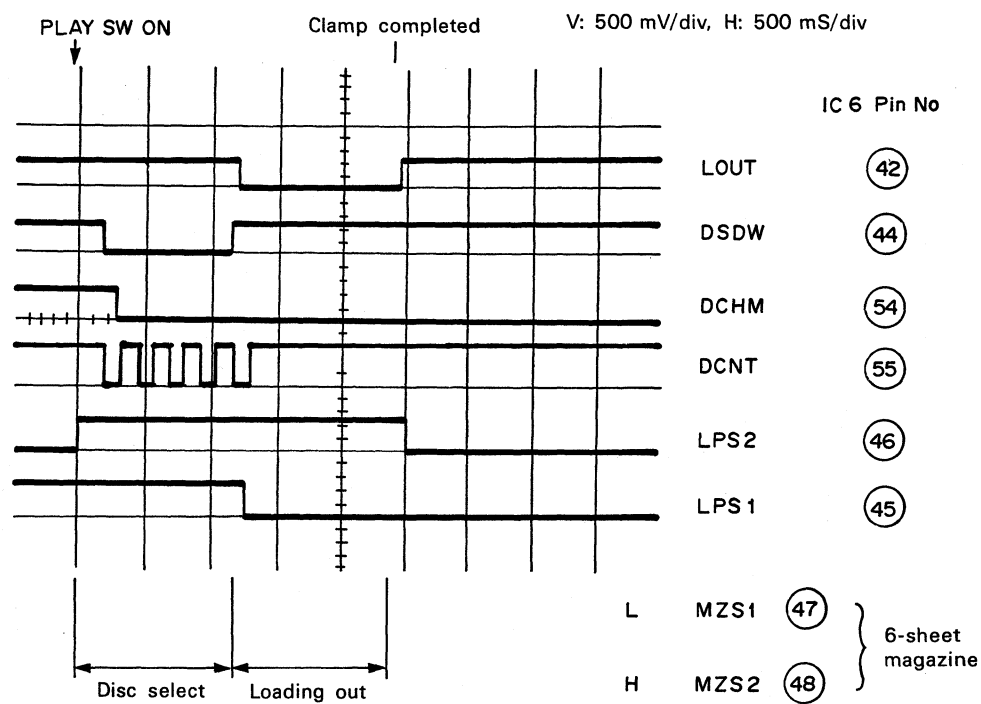
1 - TRACK JUMP



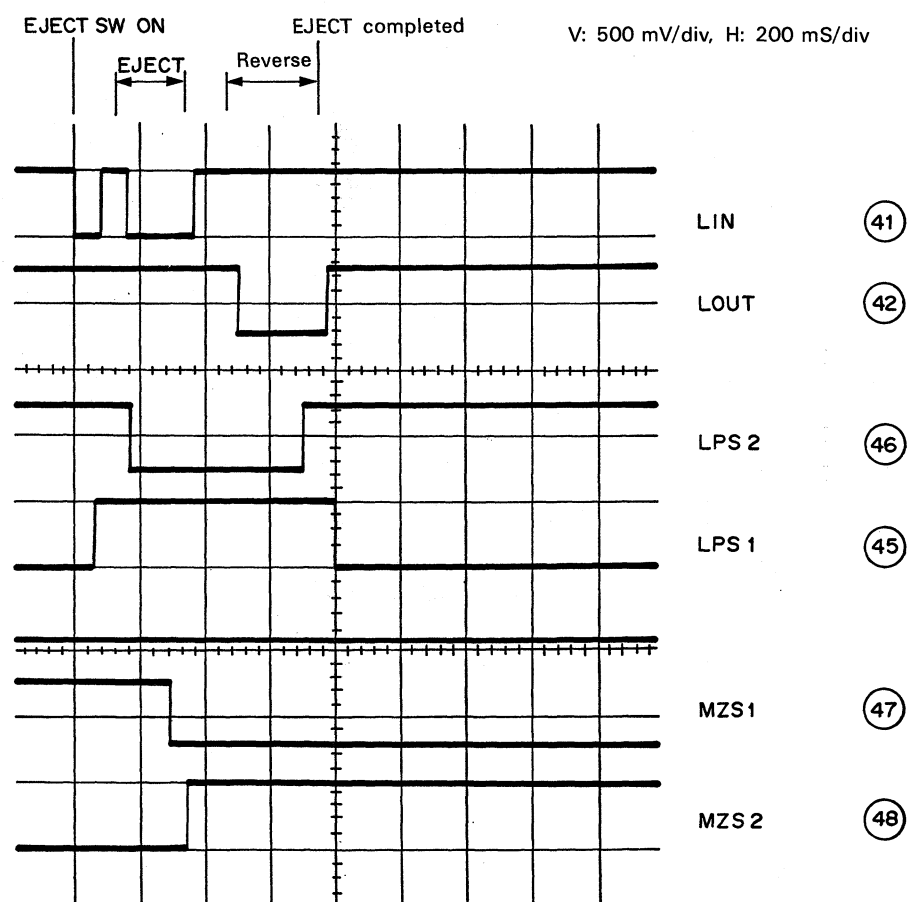
- Jump-timing are all for FWD jumps. In case of REV jump directions of periods in TRACKING/CARRIAGE and polarity of SENS (TRACK, COUNT, SEARCH) input are reversed.
- Refer to FLOW CHART and PROGRAM DESCRIPTION.
- H/L in this timing chart are only for convenience sake, not the actual port's output etc

Loading
disc select

DISC 6 Play



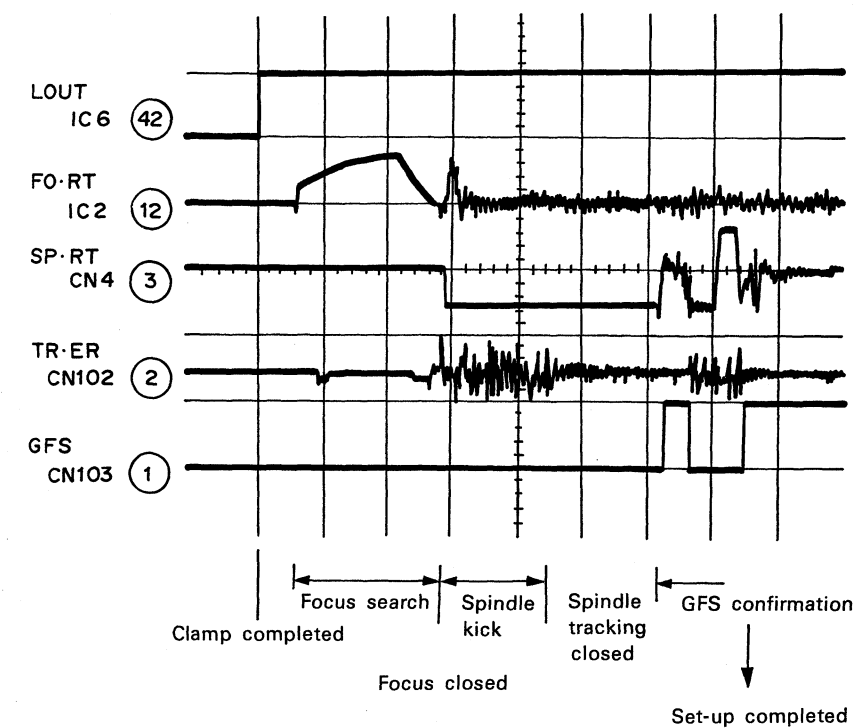
EJECT



SET UP

TOC read-in

V: 500 mV/div, H: 200 mS/div

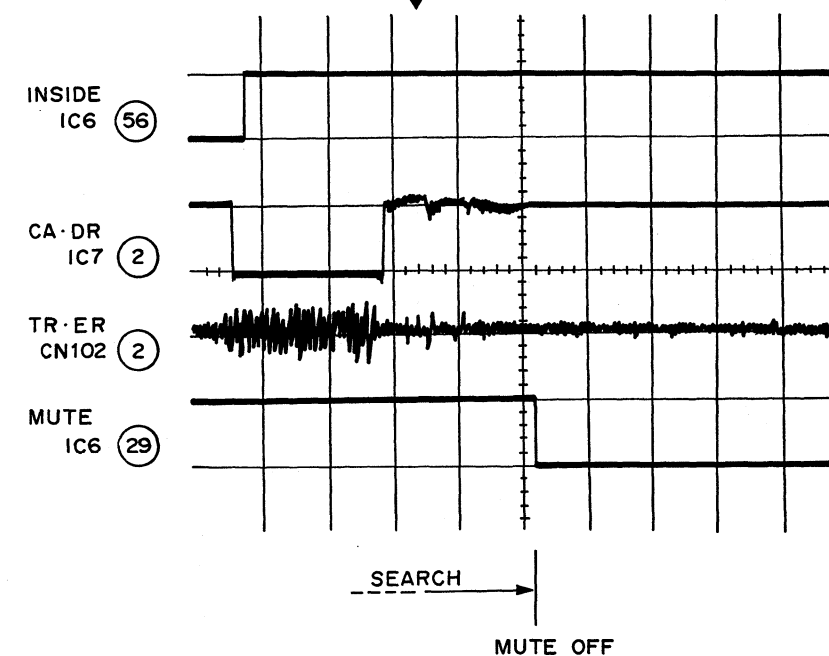


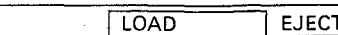
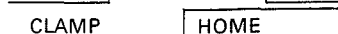
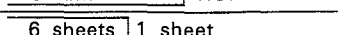
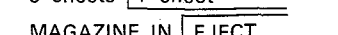
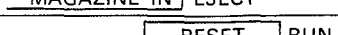
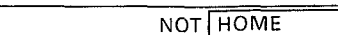
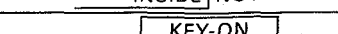
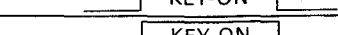
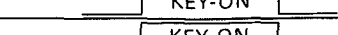
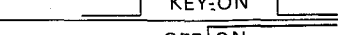
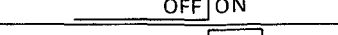
SEARCH

PLAY

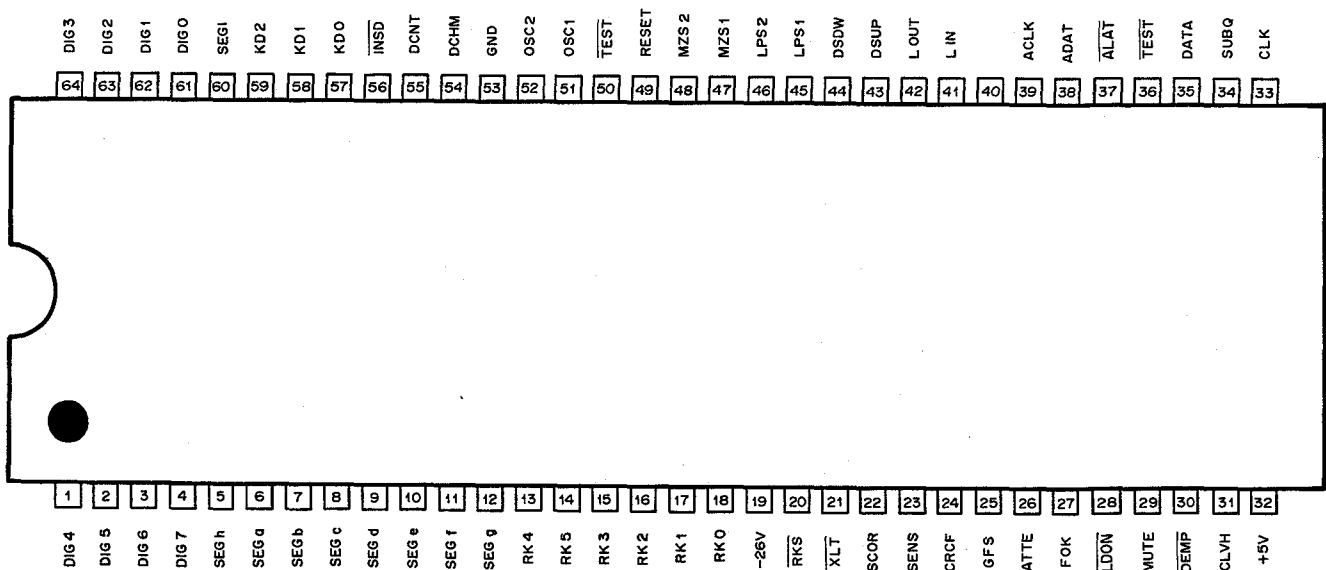
DISC 6 TRACK 9

V: 500 mV/div, H: 500 mS/div

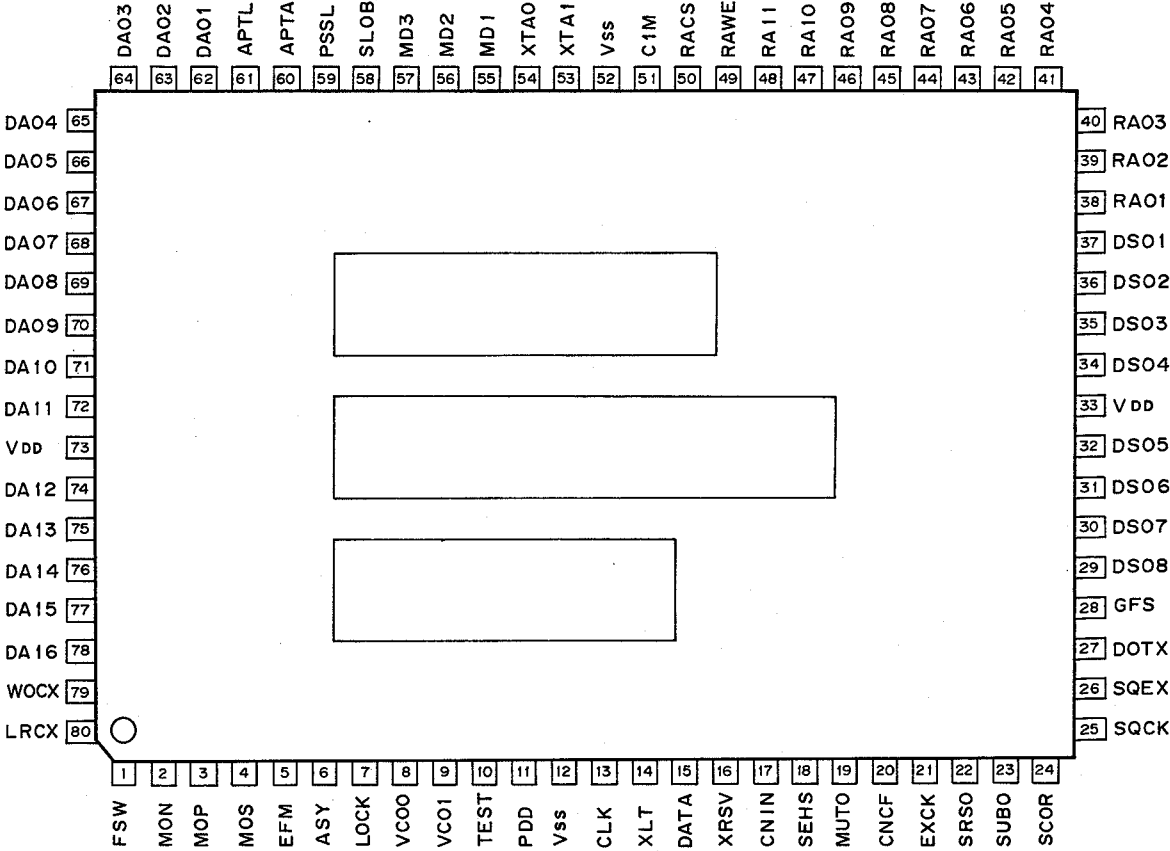


Pin No.	Port	Name	I/O	Function	Initial level
45	R ₉₀	LPS1	I	Loading position 	—
46	R ₉₁	LPS2	I	SW input 	—
47	R ₉₂	MZS1	I	Magazine discrimination 	—
48	R ₉₃	MZS2	I	SW input 	—
49	RESET	—	I	CPU reset input 	—
50	TEST	—	I	+5V (TP for factory use)	—
51	OSC1	—	I	External clock (4.2336MHz)	—
52	OSC2	—	O	(OPEN)	—
53	GND	—	—	GND	—
54	D0	DCHM	I	Disc selector home SW input 	—
55	D1	DCNT	I	Disc count pulse input 	—
56	D2	INSD	I	Slider inside SW input 	—
57	D3	KD0	I	Key matrix input 	—
58	D4	KD1	I	Key matrix input 	—
59	D5	KD2	I	Key matrix input 	—
60	D6	SEGI	O	Segment indication data output (I) 	L
61	D7	DIG0	O	Key display matrix digit output 	L
62	D8	DIG1	O	Key display matrix digit output 	L
63	D9	DIG2	O	Key display matrix digit output 	L
64	D10	DIG3	O	Key display matrix digit output 	L

PD3095



CXD1135Q



Pin Description

Pin No.	Pin name	I/O	Function
1	FSW	O	Output filter time constant selection output of spindle motor
2	MON	O	ON/OFF control output of spindle motor
3	MDP	O	Drive output of spindle motor. Rough control during CLV-S mode and phase control during CLV-P mode.
4	MDS	O	Drive output of spindle motor. Speed control during CLV-S mode.
5	EFM	I	EFM signal input from the RF amplifier
6	ASY	O	Output to control slice level of EMF signal
7	LOCK	O	Perform sampling with WFCK/16 of GFS signal and if it is "H", outputs "H" consecutively 8 times. If it is "L", outputs "L".
8	VCOO	O	VCO output. When it is locked to EFM signal, $f=8.6436\text{MHz}$.
9	VCOI	I	VCO input
10	TEST	I	(0V)
11	PDO	O	Phase comparative output of EFM signal and VCO/2
12	VSS	—	GND (0V)
13	CLK	I	Serial data transfer clock input from CPU. Latches data at rising edge of clock.
14	XLT	I	Latches input from CPU. Latches data (serial data from CPU) of 8-bit shift register to each register.
15	DATA	I	Serial data input from the CPU
16	XRST	I	System reset input. Reset during "L".
17	CNIN	I	Tracking pulse input
18	SENSE	O	Outputs internal condition corresponding to address
19	MUTG	I	Muting input. When the ATTM of the internal register is "L", normal condition with MUTG at "L" and no sound condition at "H".
20	CRCF	O	Outputs CRC checking result of sub-code Q
21	EXCK	I	Clock input for the serial output of the sub-code
22	SBSO	O	Serial output of sub-code
23	SUBQ	I	Sub-code Q output
24	SCOR	O	Sub-code SYNC S0+S1 output
25	SQCK	I/O	Reading clock of sub-code Q
26	SQEX	I	Selection input of SQCK
27	DOTX	O	Digital audio interface output (When OFF, outputs WFCK.) (OPTION)
28	GFS	O	Displays output of locked condition of frame SYNC.
29	DB08	I/O	Data pin of external RAM. DATA8 (MSB).
30	DB07	I/O	Data pin of external RAM. DATA7.
31	DB06	I/O	Data pin of external RAM. DATA6.
32	DB05	I/O	Data pin of external RAM. DATA5.
33	VDD	—	Power supply (+5V)
34	DB04	I/O	Data pin of external RAM. DATA4.
35	DB03	I/O	Data pin of external RAM. DATA3.
36	DB02	I/O	Data pin of external RAM. DATA2.
37	DB01	I/O	Data pin of external RAM. DATA1 (LSB).
38	RA01	O	Address output of external RAM. ADDR01 (LSB).
39	RA02	O	Address output of external RAM. ADDR02
40	RA03	O	Address output of external RAM. ADDR03
41	RA04	O	Address output of external RAM. ADDR04
42	RA05	O	Address output of external RAM. ADDR05
43	RA06	O	Address output of external RAM. ADDR06
44	RA07	O	Address output of external RAM. ADDR07
45	RA08	O	Address output of external RAM. ADDR08

Pin No.	Pin name	I/O	Function
46	RA09	O	Address output of external RAM. ADDR09
47	RA10	O	Address output of external RAM. ADDR10
48	RA11	O	Address output of external RAM. ADDR11 (MSB)
49	RAWE	O	Write Enable signal output to the external RAM. (Active during "L".)
50	RACS	O	Chip Select signal output to the external RAM. (Active during "L".)
51	C4M	O	1/2-divided output of crystal. $f=4.2336\text{MHz}$.
52	VSS	—	GND (0V)
53	XTAL	I	Crystal oscillating circuit input. $f=8.4672\text{MHz}$ or $f=16.9344\text{MHz}$.
54	XTAO	O	Crystal oscillating circuit output. $f=8.4672\text{MHz}$ or $f=16.9344\text{MHz}$.
55	MD1	I	Mode selection input 1
56	MD2	I	Mode selection input 2
57	MD3	I	Mode selection input 3
58	SLOB	I	Code selection input of audio data output. 2's complement output during "L" and offset binary output during "H".
59	PSSL	I	Mode selection input of audio data output. Serial output during "L" and parallel output during "H".
60	APTR	O	Aperture compensation control output. 88.2kHz during filter ON and 44.1kHz during OFF.
61	APTL	O	Aperture compensation control output. 88.2kHz during filter ON and 44.1kHz during OFF.
62	DA01	O	DA01 (LSB of parallel audio data) output when PSSL="H". C1F1 output when PSSL="L".
63	DA02	O	DA02 output when PSSL="H". C1F2 output when PSSL="L".
64	DA03	O	DA03 output when PSSL="H". C2F1 output when PSSL="L".
65	DA04	O	DA04 output when PSSL="H". C2F2 output when PSSL="L".
66	DA05	O	DA05 output when PSSL="H". C2FL output when PSSL="L".
67	DA06	O	DA06 output when PSSL="H". C2PO output when PSSL="L".
68	DA07	O	DA07 output when PSSL="H". RFCK output when PSSL="L".
69	DA08	O	DA08 output when PSSL="H". WFCK output when PSSL="L".
70	DA09	O	DA09 output when PSSL="H". PLCK output when PSSL="L".
71	DA10	O	DA10 output when PSSL="H". UGFS output when PSSL="L".
72	DA11	O	DA11 output when PSSL="H". GTOP output when PSSL="L".
73	VDD	—	Power supply (+5V)
74	DA12	O	DA12 output when PSSL="H". RAOV output when PSSL="L".
75	DA13	O	DA13 output when PSSL="H". C4LR output when PSSL="L".
76	DA14	O	DA14 output when PSSL="H". C210 output when PSSL="L".
77	DA15	O	DA15 output when PSSL="H". C210 output when PSSL="L".
78	DA16	O	DA16 (MSB of parallel audio data) output when PSSL="H". Data output when PSSL="L".
79	WDCK	O	Strobe signal output. 176.4kHz during filter ON and 88.2kHz during OFF.
80	LRCK	O	Strobe signal output. 88.2kHz during filter ON and 44.1kHz during OFF.

SPINDLE SERVO, LPF

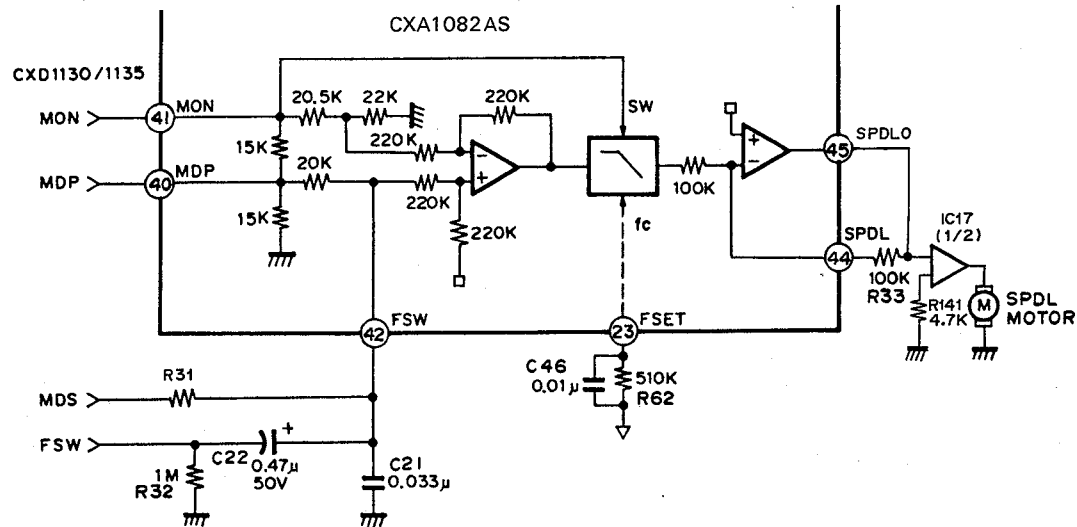


Fig. 3-4

A 200 Hz LPF is formed at the 0.033 μ F connected to Pin 42 and 20 k Ω resistor and a secondary LPF is formed at the built-in LPF (Pin 23: f_c - 200 Hz with a 510 k Ω resistor, thereby eliminating the carrier components of the CLV Servo Error signals: MDS and MDP. In CLV-S Mode, FSW goes low and the f_c value of the Pin 42 LPF is lowered to further reinforce the filter.

VCO LOOP FILTER, 8.64 MHz VCO

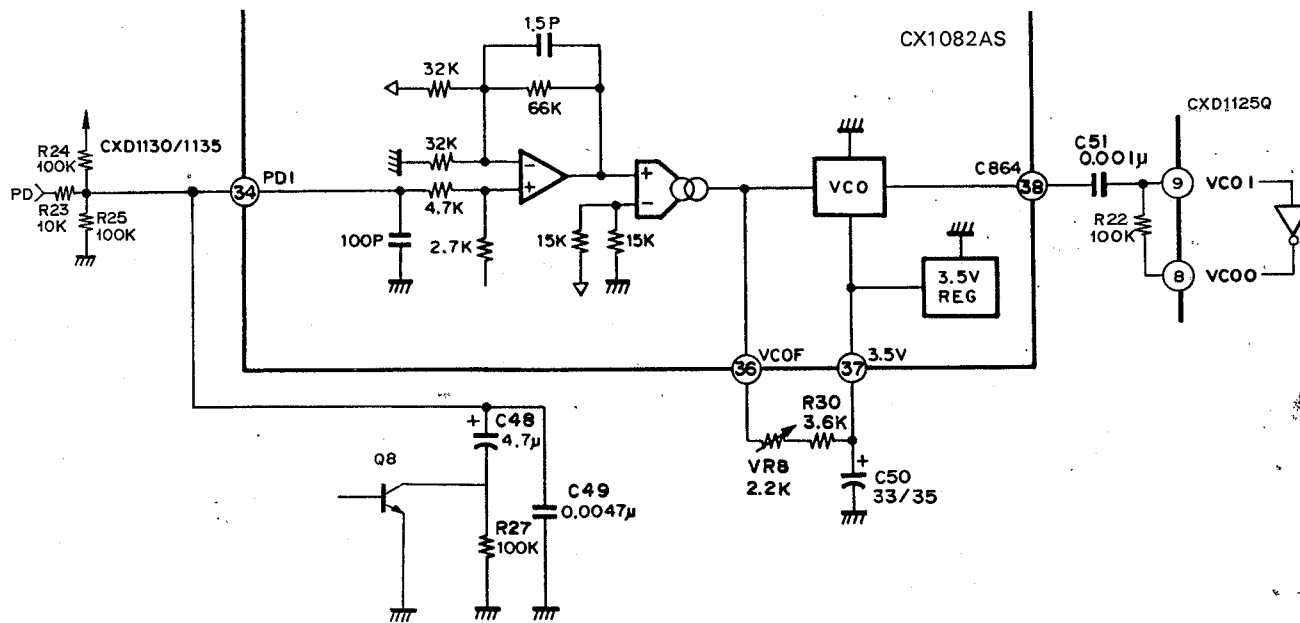


Fig. 3-5

The phase comparison output PDO which is input from Pin 34 subjected to V-I conversion after having its PWM carrier component eliminated at the Loop Filter. It is then added to the current from Pin 36 which is used for setting the self-modulating frequency in order to control the VCO frequency. The self-modulating frequency of the VCO is approximately in inverse proportion to the value of the resistor between Pins 36 and 37.

COMMAND

The input data used for operating this IC actually consists of eight bits. In the following description, however, each command will be expressed using a two-digit hexadecimal format of \$XX (with X ranging from 0 to F).

1. \$0X (②④ SENS = "FZC")

This command is related to the control of the focus servo. Its bit configuration is as follows:

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	0	FS4	FS3	FS2	FS1

The four focus-related SWs are FS1 to FS4, which respectively correspond to D0 to D3 above.

\$00 When FS1=0, Pin 13 is charged to: $(22 \mu\text{A} - 11 \mu\text{A}) \times 50 \text{ k}\Omega = 0.55\text{V}$.

Moreover, if FS2=0, this voltage is transmitted no further and the ⑪ output becomes 0 V.

\$02 In the above status, only FS2 becomes 1. At this time, a negative output is sent from Pin 11. This voltage level is stipulated as follows:

$(22 \mu\text{A} - 11 \mu\text{A}) \times 50 \text{ k}\Omega \times \text{Resistance value between ⑪, ⑫} / 50 \text{ k}\Omega$ Equation (1)

\$03 In the above status, FS1=1 so that the +22 μA power supply is cut off.

Next, the Charge/Recharge circuit of CR is formed, and the voltage of Pin 13 drops with time as shown in Fig. 3-6 below.

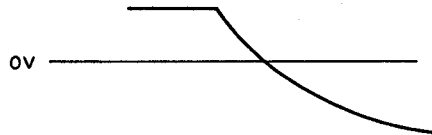


Fig. 3-6. Pin 13 Voltage when FS1 Changes from 0 to 1

This time constant is stipulated by C34 that is externally connected to 50 k Ω .

The alternate issuing of \$02 and \$03 enables the creation of the search voltage for focus. (See Fig. 3-7)

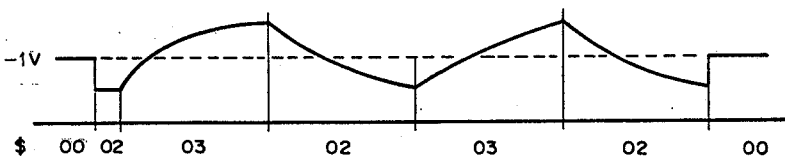


Fig. 3-7. Search Voltage Creation by S02 and S03 (Pin 11 Voltage)

1-1.Description of FS4

This switch is situated between Focus Error input 6 and the Focus Phase Compensator to receive the Focus Servo ON/OFF data.

\$00 → \$08
Focus OFF ← Focus ON

1-2.Procedure for Applying Focus

The following explanation will presume the below polarities:

- (a) The lens searching the disc in the far-to-close direction.
- (b) At this time, the output voltage ① changes from negative to positive.
- (c) Furthermore, the S-curve of the focus at this time changes according to Fig 3-8.

The Focus Servo is applied with Point (A) of Fig 3-8 as its operating point. The Focus Search operation is performed and the Focus Servo SW is set to ON while Point (A) of Fig 3-8 is being crossed. In order to also prevent malfunction, the logical product of the operation and the Focus OK signal is obtained.

This IC is designed so that FZC (Focus Zero Cross) will be output - as the signal which indicates the crossing of Point (A) - from the ② SENS pin. In addition, the Focus OK signal is output as an indication that focus is being applied (or can be applied in this case).

To summarize the above, the focus will be optimally applied in accordance with the time chart below.

Actually, as the auto-sequence of this IC is used, the system μ -COM only sends \$47 at Point (B). (Refer to page 16 for auto-sequence.)

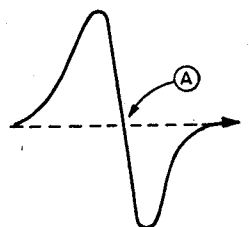


Fig. 3-8. S-Curve of the Focus

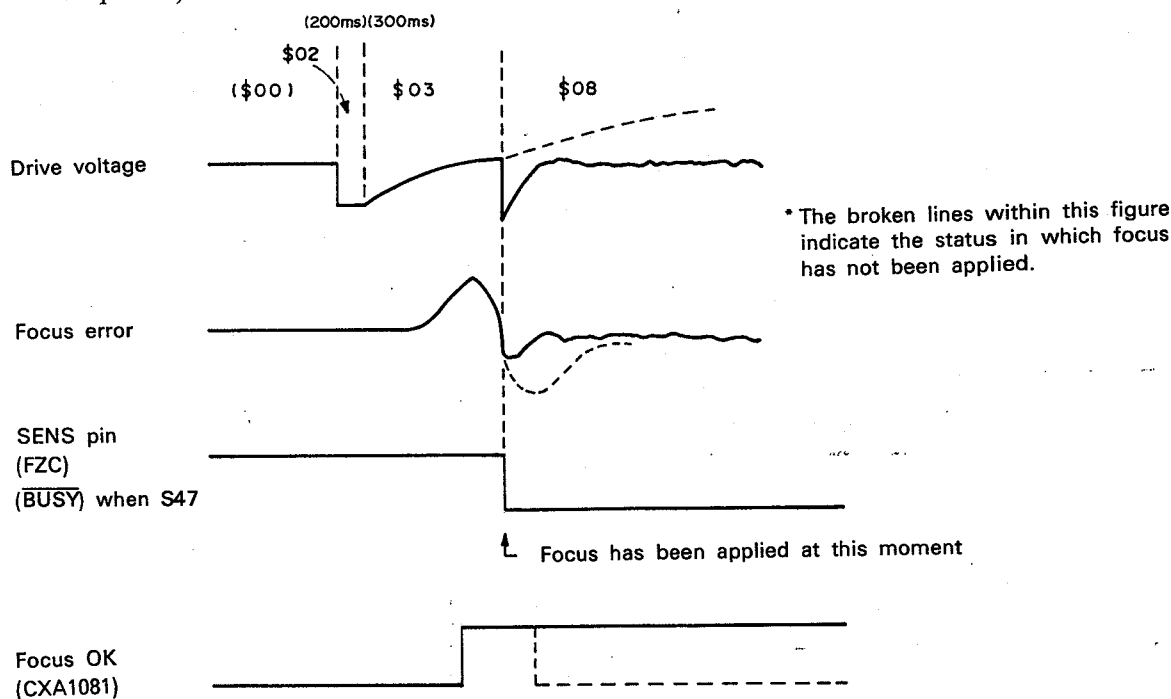


Fig. 3-9. Timing Chart of the Focus ON Operation

1-3.The ②④ SENS Pin

The data which is output by the SENS pin will vary according to the input data as follows.

Actually, as Focus IN and TRACK JUMP are performed by the auto-sequence. The output of system μ -COM CXA1082AS is only \$4X BUSY. (Refer to page 16 for auto-sequence.)

\$0X input $\rightarrow$ FZC output
 \$2X input $\rightarrow$ TZC
 \$1X input $\rightarrow$ AS
 \$3X input $\rightarrow$ SSTOP
 \$4X input $\rightarrow$ BUSY
 \$5X-\$7X input $\rightarrow$ HIGH-Z

Since any data above \$7X is a command code of CXD1135, its connection with the "SENS" pin of CXD1135 will permit the output of various types from a single pin.

2. \$1X (②④ SENS = "AS")

This command is related to the ON/OFF status of TG1, TG2 and the Break circuit. Its bit configuration is as follows:

D7	D6	D5	D4	D3	D2	D1	D0
0	0	0	1	ANTI	Break	TG2	TG1
				SHOCK	circuit		
				ON/OFF	ON/OFF		

Brake circuit description

These switches are used to switch the Up/Normal status of the Tracking Servo gain. Because the Servo circuit exceeds the linear range after performing a 100- or 10-track jump, the settling of the actuator becomes extremely bad such that it will, for example, return after jumping only ten tracks, although a 100-track jump was intended, and such phenomena will frequently occur. It is the Break circuit, however, that functions prevent such occurrences. By exploiting the 180° phase offset between the RF envelope and the tracking error due to the direction of the actuator transversing the tracks along the radius from the inner to outer tracks and its reverse direction, the Break circuit cuts out the unnecessary portion of the tracking error and applies a break.

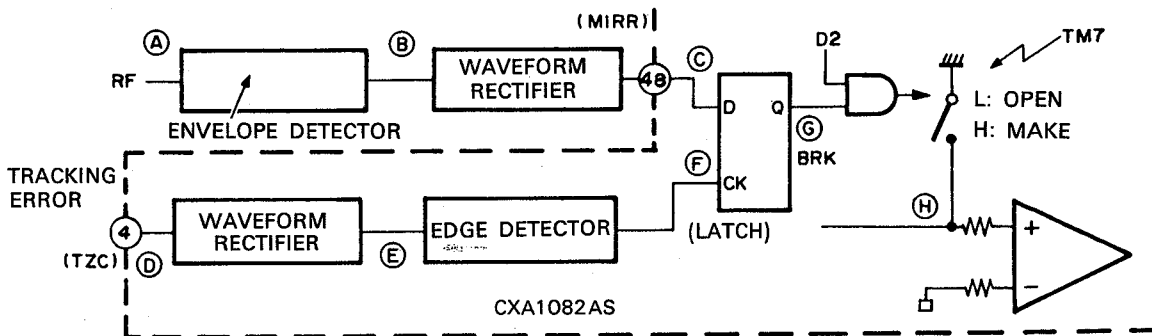


Fig. 3-10. TM7 Operation (Break Circuit)

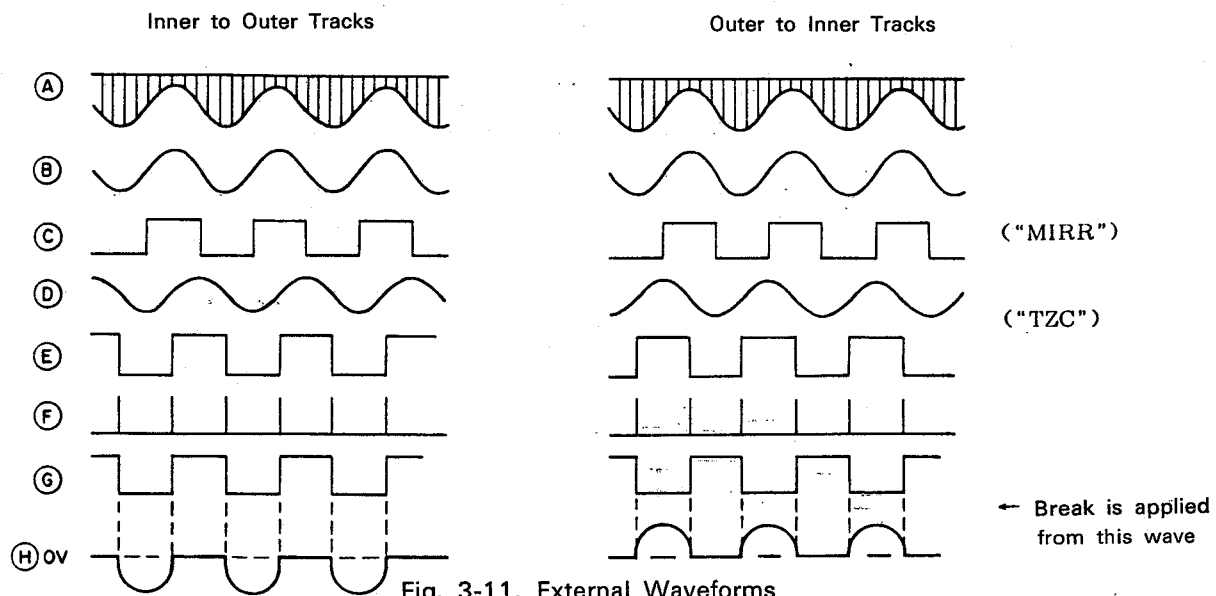


Fig. 3-11. External Waveforms

3. TRACK JUMP

These CD players performs tracking jumping of 1, 10, 50, and 100 tracks by the auto-sequence of CXA1082AS. The auto-sequence allows TRACK JUMP and FOCUS IN to be made simply sending the auto-sequence serial data once the timing data has been sent from the system μ -COM to the CXA1082AS RAM in advance.

Fig. a through d shows track jumps of 1, 10, 50 and 100 and the timing chart for auto-sequence.

Time control of A through D in the Fig. is made by the system μ -COM setting \$5X.

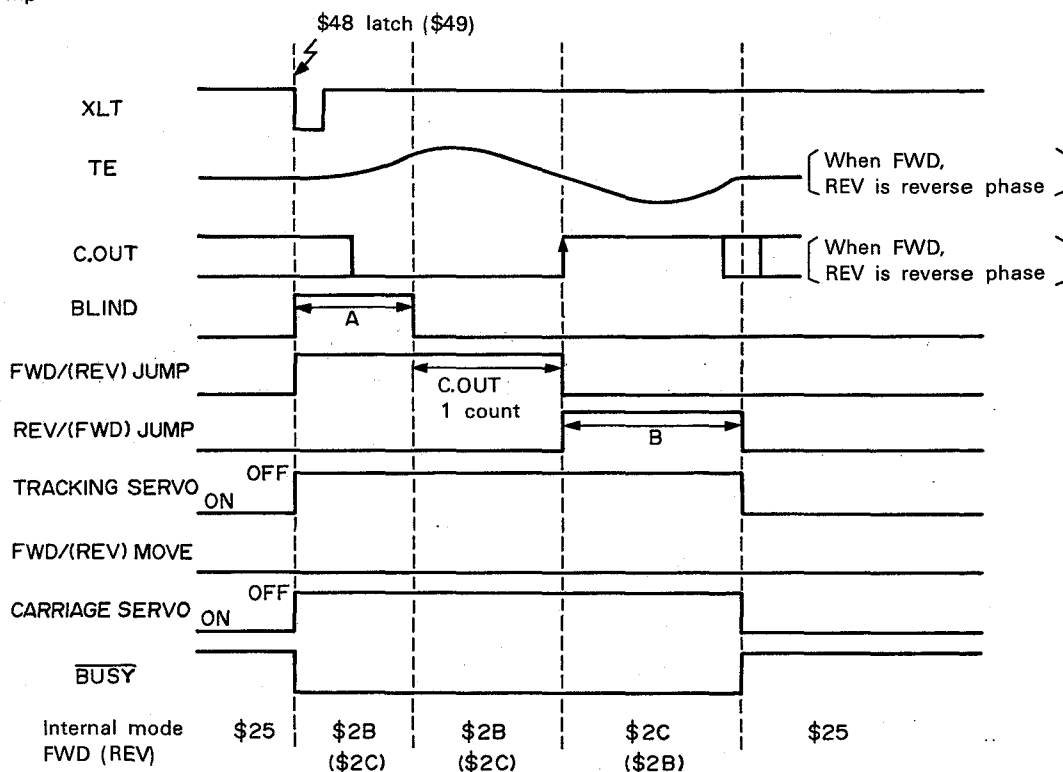
The auto-sequence is started by sending \$4X as shown in the table below.

	D3	D2	D1	D0
CANCEL	0	0	0	0
FOCUS ON	0	1	1	1
1 TRACK JUMP	1	0	0	X
10 TRACK JUMP	1	0	1	X
100 or 50 TRACK JUMP	1	1	0	X

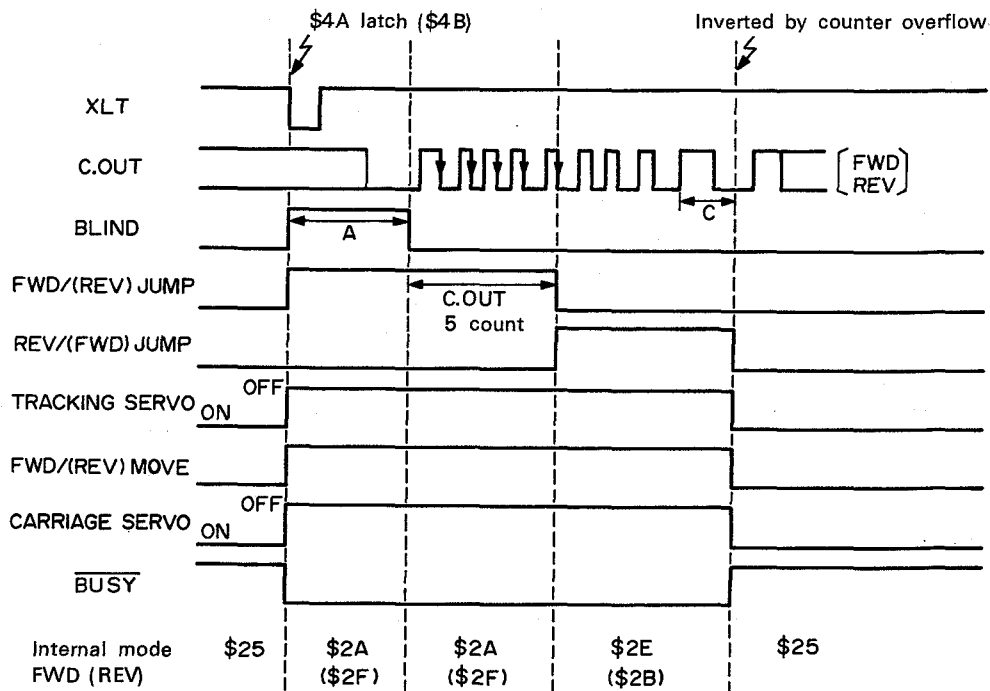
X = 0 FOWARD
X = 1 REVERSE

Auto-sequence Timing Chart

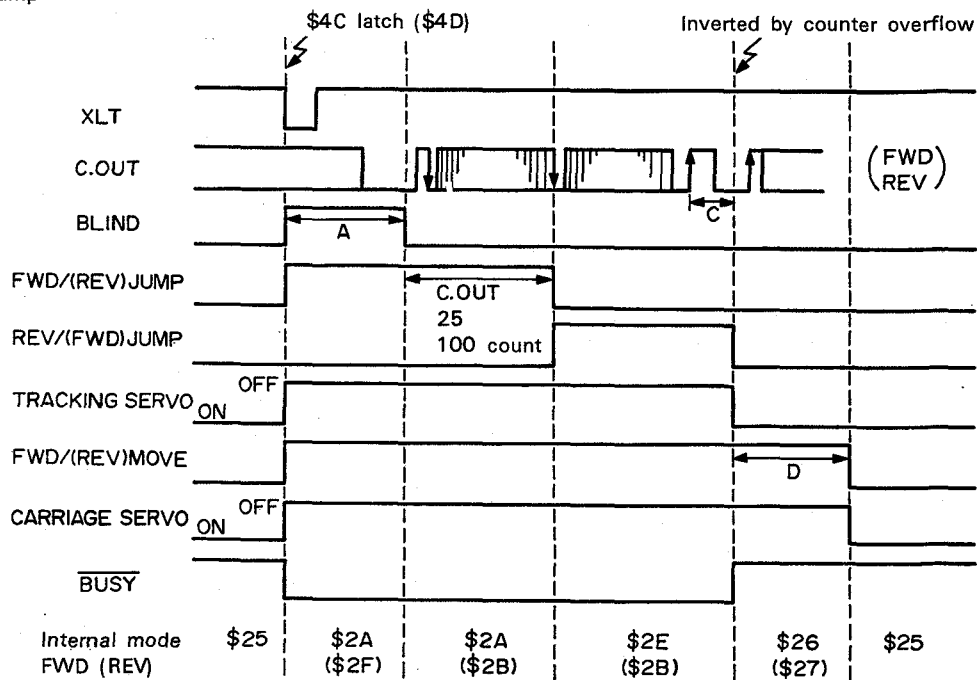
(a) 1 Track Jump



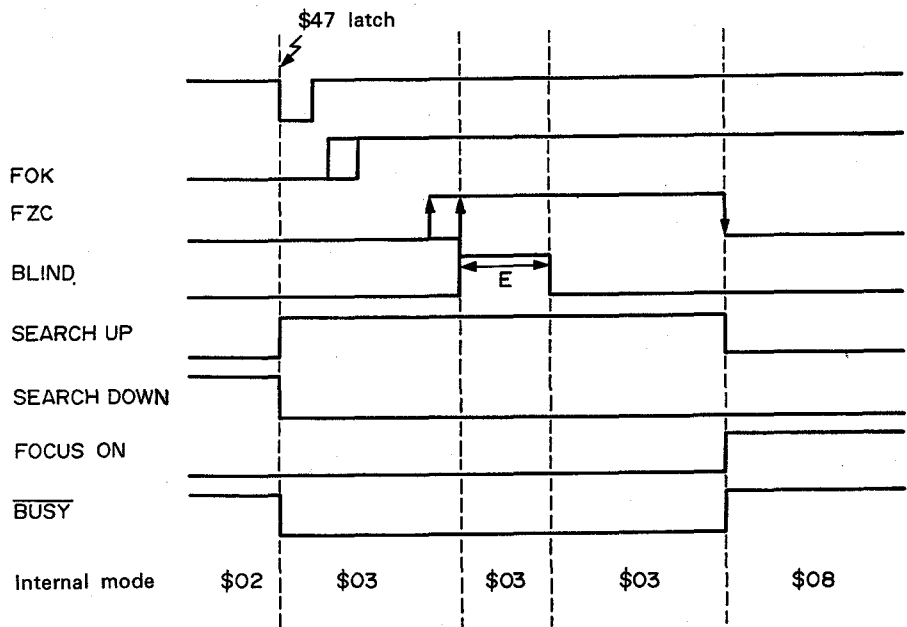
(b) 10 track jump



(c) 50
100 track jump



(d) Auto-focus



Note: The horizontal axis of this timing chart may not be proportional to the actual time.

3.2.2 CXA1081S

RF AMP

The output voltage of the photodiode that is input to the input pins (PD1 and PD2) is respectively subjected to voltage amplification of approx. five times into a 58kΩ equivalent resistor at the RF I-V Amps (1) and (2). Furthermore, addition is performed at the RF Summing Amp so that the output voltage which has been converted from the currents of the photodiodes (A + B + C + D) is output from Terminal RFO. An eye pattern check can be performed at Terminal RFO.

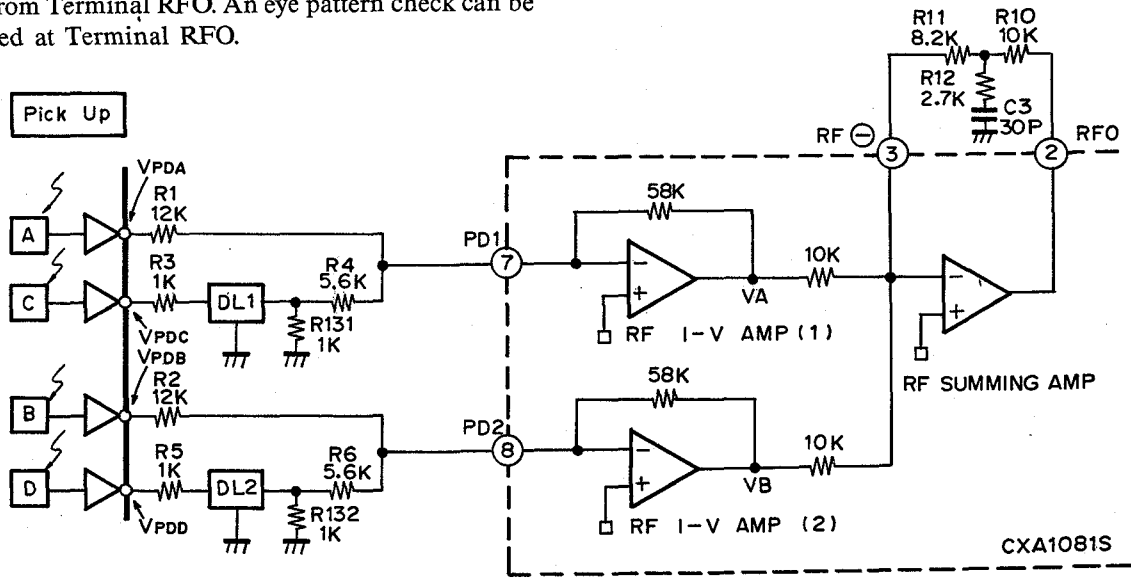


Fig. 3-12

The low-frequency component of the RFO output voltage V_{RFO} is as follows:

$$\begin{aligned} V_{RFO} &= 1.8 \times (VA \times VB) \\ &= 1.8 \times \frac{58 \text{ k}}{12 \text{ k}} \times (VPDA + VPDB + VPDC + VPDD) \end{aligned}$$

FOCUS ERROR AMP

This amp obtains the difference between the output (VA) of the RF I-V Amp (1) and the output (VB) of the RF I-V Amp (2), then outputs the voltage which has been converted from the currents of the photodiodes (A + C - B - D).

The FE output voltage (low frequency) is as follows:

$$V_{FE} = 5.4 \times (V_A - V_B)$$

$$= 5.4 \times \frac{58 \text{ k}\Omega}{12 \text{ k}\Omega} \times (V_{PPA} + V_{PDC} - V_{PDB} - V_{PDD})$$

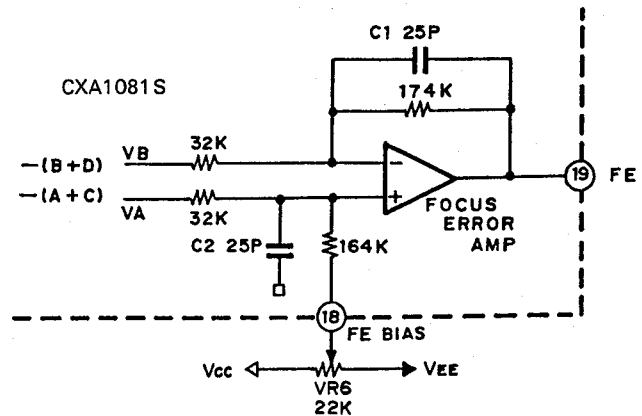


Fig. 3-13

TRACKING ERROR AMP

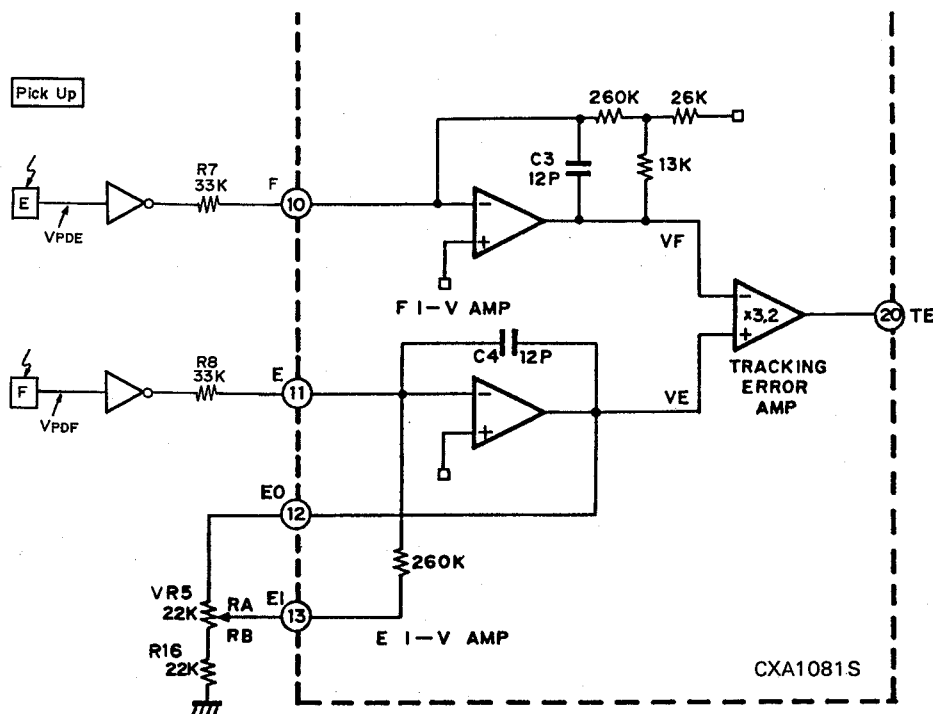


Fig. 3-14

The voltage of photodiodes for the side spots input to Terminals E and F are respectively subjected to voltage amplification at the E I-V and F I-V Amps. That is:

$$V_F = \frac{403 \text{ k}\Omega}{33 \text{ k}\Omega} \times V_{PDF}$$

$$V_E = [260 \text{ k}\Omega \times R_A / (R_B + 22 \text{ k}\Omega) + (R_A + 260 \text{ k}\Omega) / 33 \text{ k}\Omega] \times V_{PDE}$$

Furthermore, the output difference between the E I-V and F I-V Amps is obtained at the Tracking Error Amp in order to obtain the output voltage that has been converted from currents of the photodiodes (E - F) as follows:

$$V_{TE} = (V_E - V_F) \times 3.2$$

$$= (V_{PDE} - V_{PDF}) \times \frac{403 \text{ k}\Omega}{33 \text{ k}\Omega} \times 3.2$$

FOCUS OK CIRCUIT

The Focus OK circuit functions to create the window for the timing of switching ON the Focus Servo from the Focus Search status.

With respect to the RF signal of Pin ②, both its HPF signal and the reciprocal of the LPF output (inverted phase) from the Focus OK Amp output are obtained at Pin 1.

The Focus OK output is inverted in the case below:

$$V_{RFI} - V_{RFO} \approx -0.39V$$

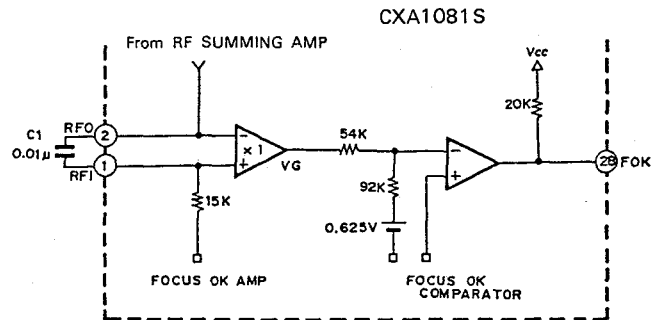


Fig. 3-15

MIRROR CIRCUIT

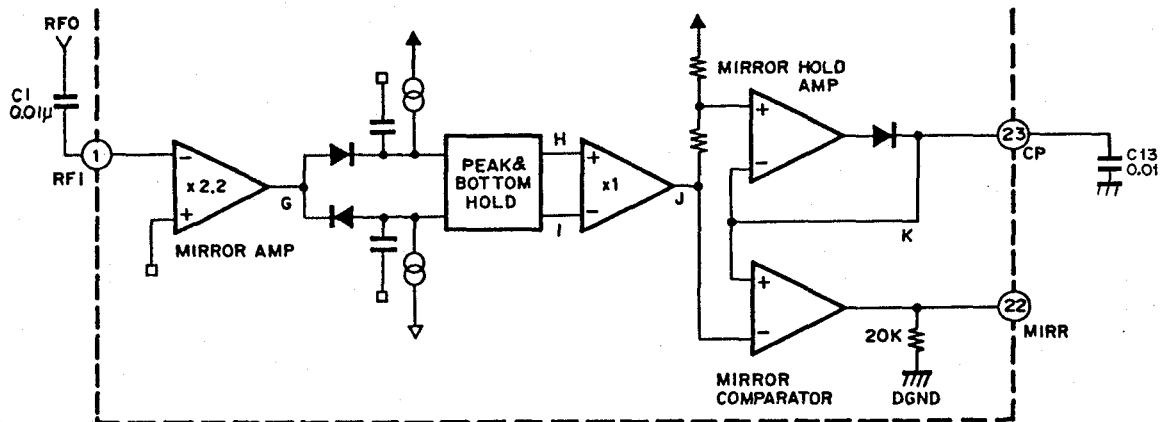


Fig. 3-16

After amplifying the RFI signal, the Mirror circuit performs Peak Hold and Bottom Hold.

Peak Hold will hold the peak value at a time constant that is capable of tracking even a 30 kHz Traverse signal, whereas Bottom Hold will hold the bottom value at a time constant that is capable of tracking even the envelope fluctuations of revolving cycles.

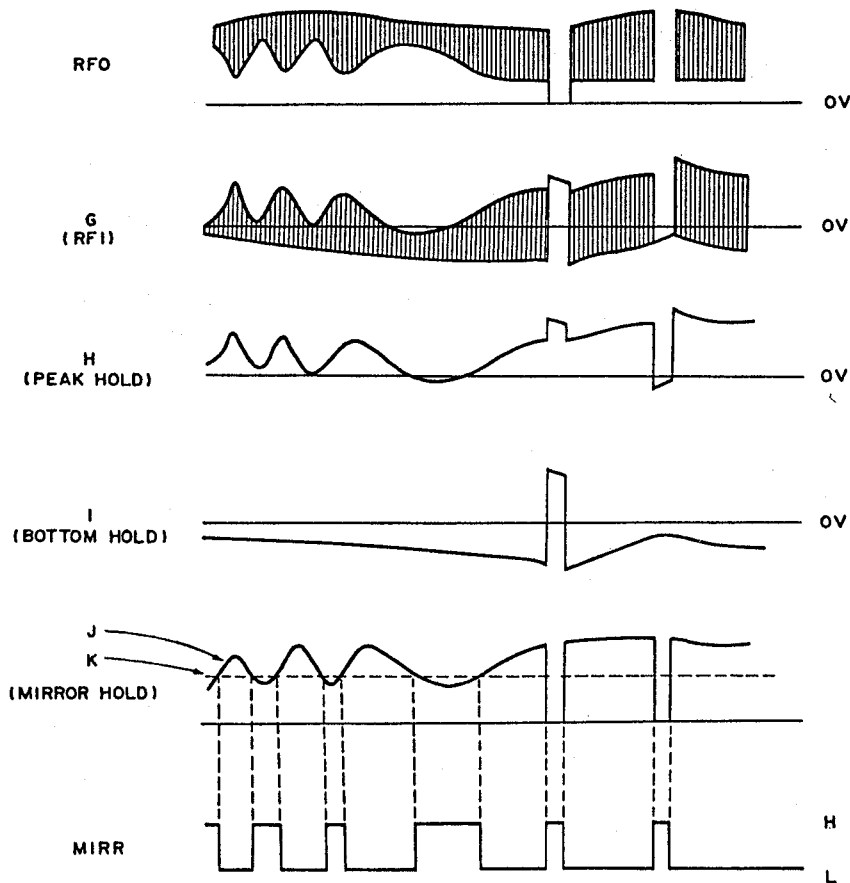


Fig. 3-17

The DC-replayed Envelope signal J is obtained from the differential amplitude of these Peak and Bottom Hold signals, H and I. The Mirror output is obtained by comparing this signal J with the signal K which has been held at peak level, using a time constant of a a level that is two-thirds that of the

peak value. In other words, the Mirror output is "L" upon a disc track or "H" between disc tracks (the Mirror section). Moreover, the Mirror output is also "H" when a defect has been detected.

EFM COMPARATOR

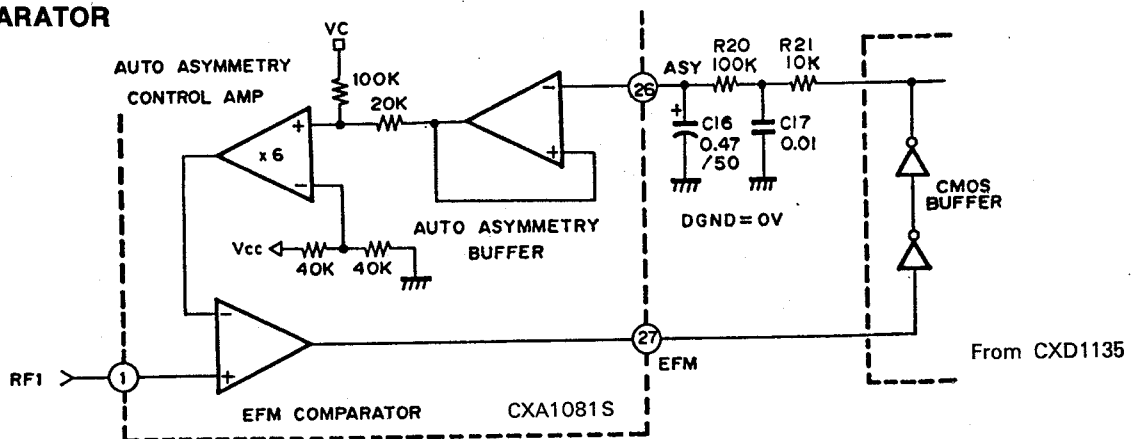


Fig. 3-18

The EFM Comparator functions to convert the RF signals into binary signals. The asymmetry caused by variance during disc manufacture cannot be eliminated merely by AC coupling. Consequently,

the reference voltage of the EFM comparator is controlled by exploiting the respective 50% probability of a 1 or 0 occurring as the value of a binary-coded EFM signal.

Note that since this EFM Comparator is of power-current SW type, its H and L levels will not equal the supply voltage, feedback is applied through the decoder C-MOS buffer.

R20, R21, C16, and C17 serve as a LPF for obtaining the DC of $(V_{cc} + DGND)/2$ [V].

DEFECT CIRCUIT

After inverting the RFI signal, the Defect circuit performs Bottom Hold using two time constants, one long and one short. The Bottom Hold performed by the short time constant sends a response at a mirror-surface defect on the disc that is 0.1 ms or longer. The Bottom Hold performed using the long time constant continues holding the mirror surface at the level preceding the defect. The Mirror Defect Detection signal is generated by performing a fine plus level shift of that mirror level by use of C coupling, then making a comparison of both signals.

This signal is used to mute the tracking error when the DEFECT output is "H" to improve the playability.

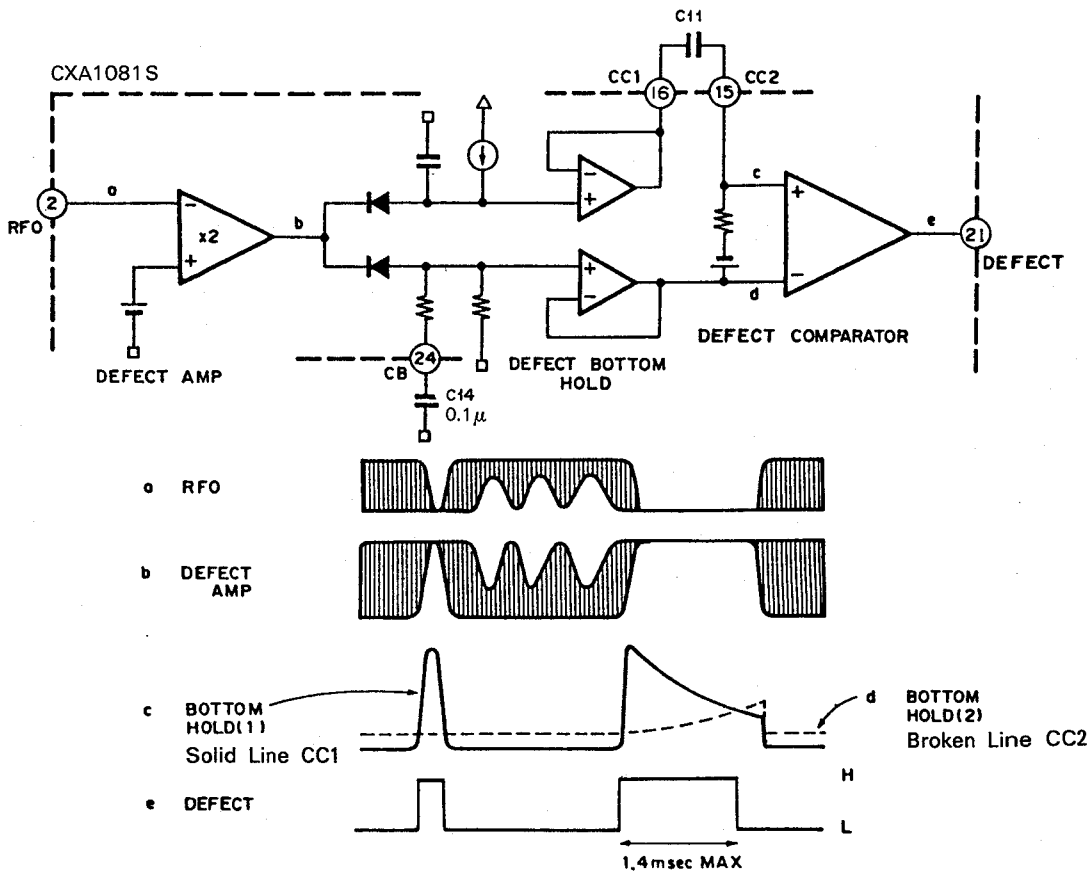


Fig. 3-19

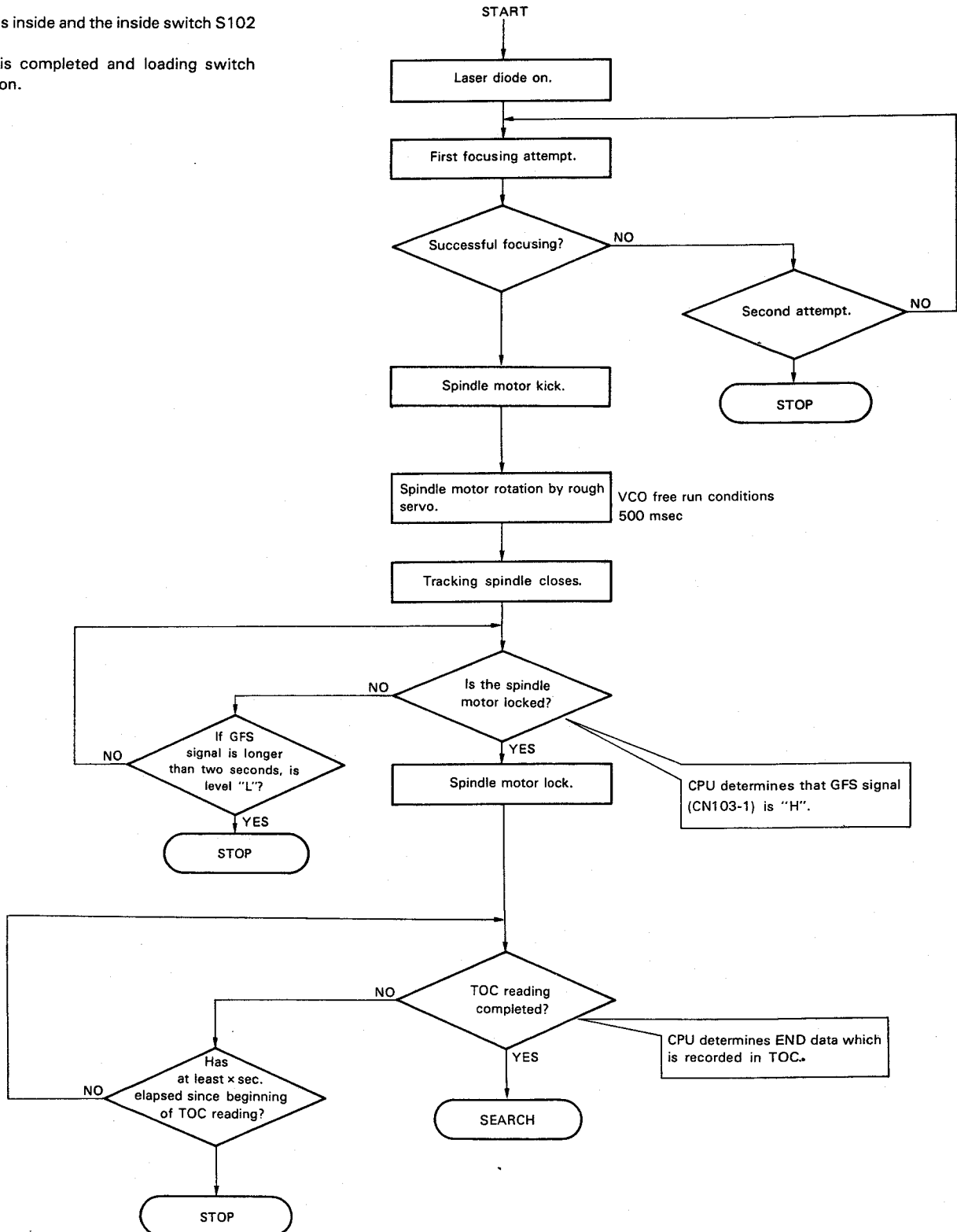
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3.3 TOC READING

Initial Settings for Reading of Table of Contents

Conditions:

- ★ Carriage is inside and the inside switch S102 is on.
- ★ Loading is completed and loading switch S101 is on.



3.4 CARRIAGE SERVO SYSTEM

The carriage servo system inputs the drive voltage for the tracking actuator. The required carriage movement components are obtained by the carriage servo equalizer as shown in Fig. 3-20.

The carriage locate operation is performed by obtaining the locate voltage by converting the internal current of the CXA1082AS into serial data. This voltage is approximately 6V but during starting and when locked, a limit of 200 mA is applied to the output current dropping the potential to less than 6V.

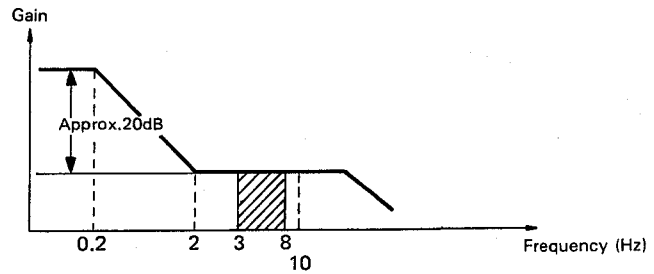


Fig. 3-20

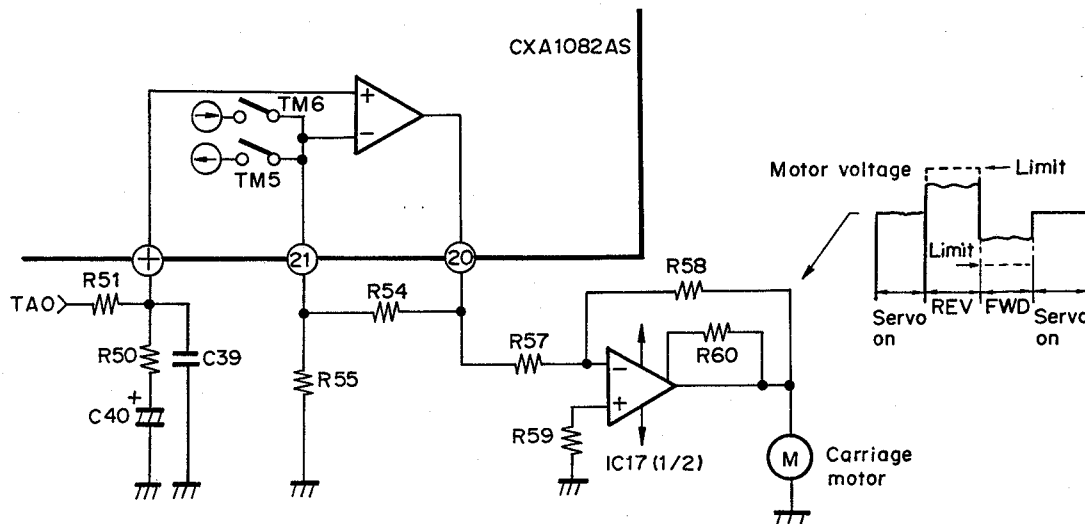


Fig. 3-21

3.5 DEMODULATOR

The demodulator is composed primarily of LSI CXD1135Q; it also includes a small amount of added-on circuits. Its functions are:

1. Bit clock regeneration using the EFM-PLL circuit.
2. Demodulation of the EFM data.
3. Detection, protection and internal extension of the frame sync signal.
4. Thorough error detection and correction.
5. Interpolation using averaging or previous value hold.
6. Demodulation of the sub-code and error detection for sub-code Q.
7. CLV servo for the spindle motor.
8. 8-bit tracking counter.
9. CPU interface using the serial bus.
10. Built-in 35th digital filter.

4. OPTICAL PATH IN THE PICK-UP

4-1 OPTICAL PATH AND OPTICAL PARTS

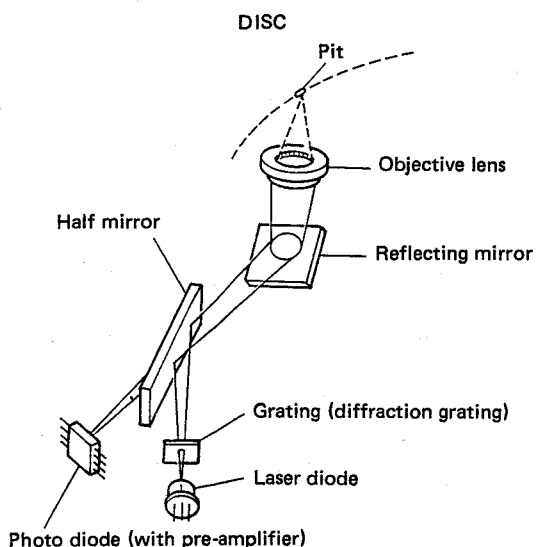


Fig. 4-1

Fig. 4-1 shows the configuration of this pick-up's optical part.

The wavelength of the light emitted from the laser diode is between 780 and 790 nm. The light is barely visible. This light source is spread into an ellipse from an ultra-small emission point. The light expands at a set angle.

The emitted light goes through a grating and is divided into three beams of 0 step and ± 1 step.

The other beams of ± 2 , 3, and n steps are also present, but are lost and not used. When the light reaches the half mirror, 50% is reflected. The remaining light permeates the half mirror and is lost.

The light then goes to the reflecting mirror where all the light is reflected to the objective lens (finite type).

Since this pick-up's objective lens uses a finite system (finite because the LD's convergence distance is finite), a collimator lens is unnecessary. The old models objective lenses are called infinite type. The light that is converged on an ultra-small diameter spot by these objective lenses is reflected by the disc and returns to the objective lens. Then it goes through the half mirror where 50% of it returns to the laser diode. The remaining 50% of light goes through and reaches the photo diode.

This has been a general outline of the optical path. The features of each part are explained in the following section.

4-2 FEATURE OF EACH PART

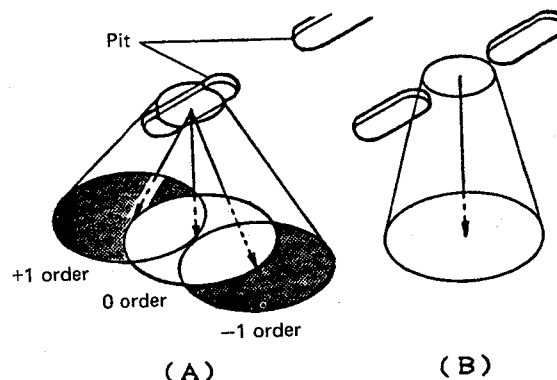


Fig. 4-2

(1) Laser diode (LD)

The size of previously-used LDs was 9ϕ . However, a newly-developed LD with a size of 5.6ϕ has been introduced. This has resulted in a compact and lightweight optical path.

(2) Objective lens

The collimator lens has been replaced by the finite objective lens which has a finite convergence distance for the LD's optical path. This has resulted in lower costs while preserving high performance.

The finite objective lens, like the conventional infinite lens, is a high-performance lens designed to attain sufficient optical performance even when the optical parts are not parallel within the optical path.

(3) Half mirror

The light that returns to the objective lens goes through the half mirror. Since the half mirror is a glass plate, it is known that astigmatism is created for the light which enters at an angle. The old model similarly used a glass plate and had a device in its optical part to cancel this astigmatism. Whereas, this new pick-up uses the astigmatism advantageously for the focus servo.

Consequently, the multi-lens used in previous models has not been incorporated in this new pick-up. This has resulted in lower costs while preserving high performance. At the same time, the points of parts have been reduced, improving dispersion and reliability.

(4) Axle-sliding actuator

The position accuracy of the objective lens is an important factor for the optical pick-up. The pick-up has a sliding axle for the actuator which drives the objective lens. Accurate and stable positioning of the objective lens is thus attained, resulting in stable trackability. Also, a smooth frequency response with low resonance is also realized as with the conventional spring-supported type.

(5) Resin body

The CD body has been made with computer-simulated technology. To keep body changes to a minimum, resin has been incorporated. Due to the mounting, materials were carefully selected and the same reliability as the previously-used aluminum has been realized.

The use of resin has made possible mounting configurations that were not possible with aluminum. Therefore the use of adhesives has been greatly reduced for improved reliability.

4-3 RF and servo signal

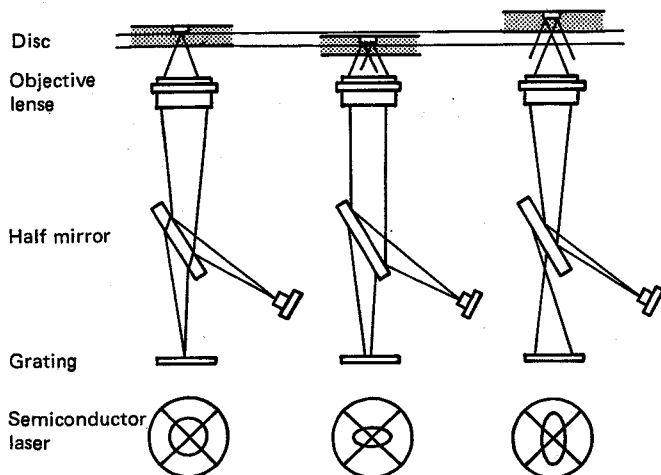


Fig. 4-3

(2) RF and servo signals

The beam, which has been reduced to an extremely small spot by the objective lens, now strikes the disc side on which the signal is located. Part of the beam is then reflected back to the objective lens and photo diode. A diagram showing how this beam is reflected off the disc is shown in figure 4-2. (A) shows what happens when the concentrated beam is directed at a pit. Normally, this reflected light would disrupt the output light beam. In the laser diodes used in CD players, however, noise is reduced instead, resulting in stable performance. This property is very advantageous for the half prism which allows only half of the light energy to pass.

A pit and (B) shows the same beam when reflected from a space between pits. In case (A), the beam is diffracted, so the dark part of the beam does not return to the objective lens. Instead, only the center of the beam passes through the objective lens and reaches the photo diode. In case (B), there is no diffraction because the beam does not strike a pit. Therefore, the entire beam is reflected back to the photo diode, producing brighter beam than when a pit is reached. In this system, the data on the disc, which is represented by pits, is covered into an electrical signal at the photo diode according to the intensity (brightness) of the reflected beam. The RF signal is then produced from this electrical signal by the computation circuit.

Fig. 4-3 shows how the focus signal is detected. (1) is when the beam from the laser diode is accurately focused on the disc by the objective lens. (2) shows what happens when the disc comes closer to the pickup and (3) shows what happens when the disc moves farther away. The grating and concave lens, which have no direct effect on the focusing are not shown in the diagram.

In case (1), the beam emanating from point 01 is reflected and diffracted on the disc surface to produce the condensed beam (02). In case (2), the beam is directed at a point farther than that of beam 02. Fig. 4-4 shows the properties of the half mirror. 1 through 7 shows the shape of the beam at each point. Between points 2 and 6, which are in a straight line, the beam is circular at point 4. Point 6 corresponds to beam 02 of fig. 4-3. If we assume that fig. 4-4 shows mode (1) of fig. 4-3, that means the beam is circular because the photo diode is located at point 4. In mode (2) of fig. 4-3, the location of the photo diode is closer to the cylindrical lens than it was in fig. 4-4. That means the shape of the beam is the same as that of point 3 (an ellipse that has a longer width than height). In mode (3) of fig. 4-3, the shape of the beam is that of point 5, an ellipse that has a longer height than width.

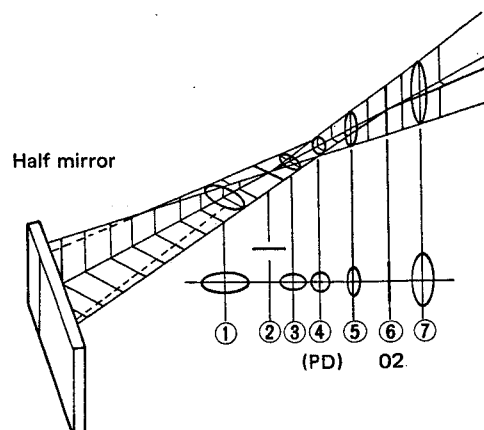


Fig. 4-4 Half mirror

These beam shapes are shown in fig. 4-3. By performing a $(A + C) - (B + D)$ computation using the A-D photo diode quartering elements, the focus signal is produced.

Let's consider what happens as the objective lens is gradually moved closer to the disc. If the objective is fairly far from the disc, only a small amount of light will be returned to the photo diode. Furthermore, since the returning light is quartered, the focus signal would be 0.

If the objective lens is moved closer to the disc until point 7 of fig. 4-4 is reached, the shape of the beam at the photo diode becomes an ellipse that is higher than it is wide.

The focus signal would then be positive because $(A + C)$ is greater than $(B + D)$. However, after the peak (vertical line) is reached at point 6, it begins to return to zero. If it becomes zero at point 4, the beam becomes an ellipse that is wider than it is high because $(A + C)$ is less than $(B + D)$ and the focus signal becomes negative. After peaking at point 2, the focus signal returns to zero just as when the objective lens is too far from the disc. Focusing signals produced in the above manner are shown in fig. 4-5. Due to its shape, this is called an S-curve, an important graph that expresses the properties of the focus signal.

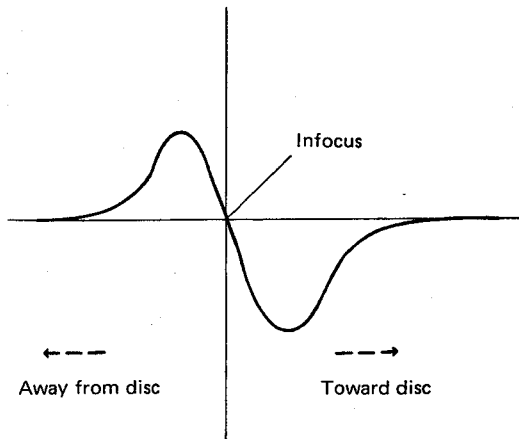


Fig. 4-5 S-curve

Since the real purpose of the focus servo is to maintain the focus signal at zero, only a tiny section at the center of the S-curve appears as residual error.

Fig. 4-6 shows how the tracking signal is detected. The beam from the laser diode is divided into three beams. The ± 1 order beams on either side of the 0 order beam are used to produce the tracking signal. These two beams are, like the 0 order beam, are directed at the disc in a tiny spot. In principle, the spots of the two side beams are an equal distance from the center spot as shown in fig. 4-6. (The actual distance is much greater than that shown in the figure.) These two side beams are reflected and diffracted and returned to their respective detection elements in the photo diode. If these two elements detect the same intensity from both beams, it can be assumed that the primary (0 order) beam is correctly following the line of pits on the disc. Fig. 4-7 shows the relationship between the track and the output of each photo diode element (A, B and C).

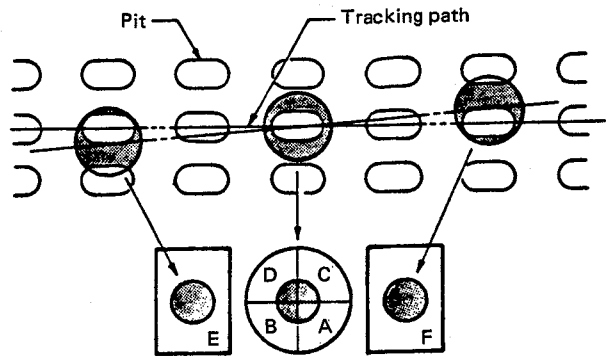


Fig. 4-6 Detection of tracking error

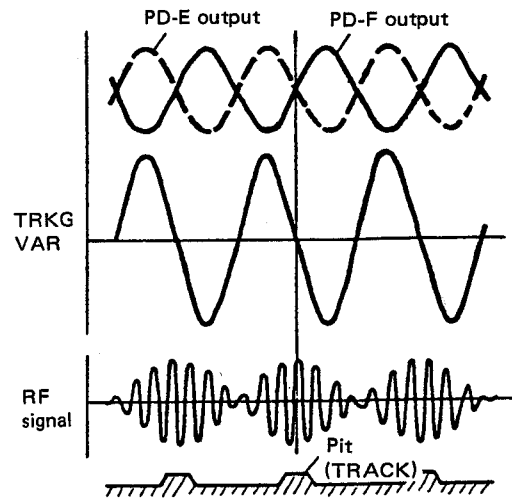


Fig. 4-7 Tracking error and the RF signal

5. DESCRIPTION OF MECHANISM

5.1 OUTLINE

The PD-M40 and PD-M50 are magazine type CD players. The sections relating to mechanical operations consist of:

1. State detector section
2. Disc select mechanism
3. Disc counter section
4. Loading mechanism

Circuit block diagram is shown in Fig. 5-1.

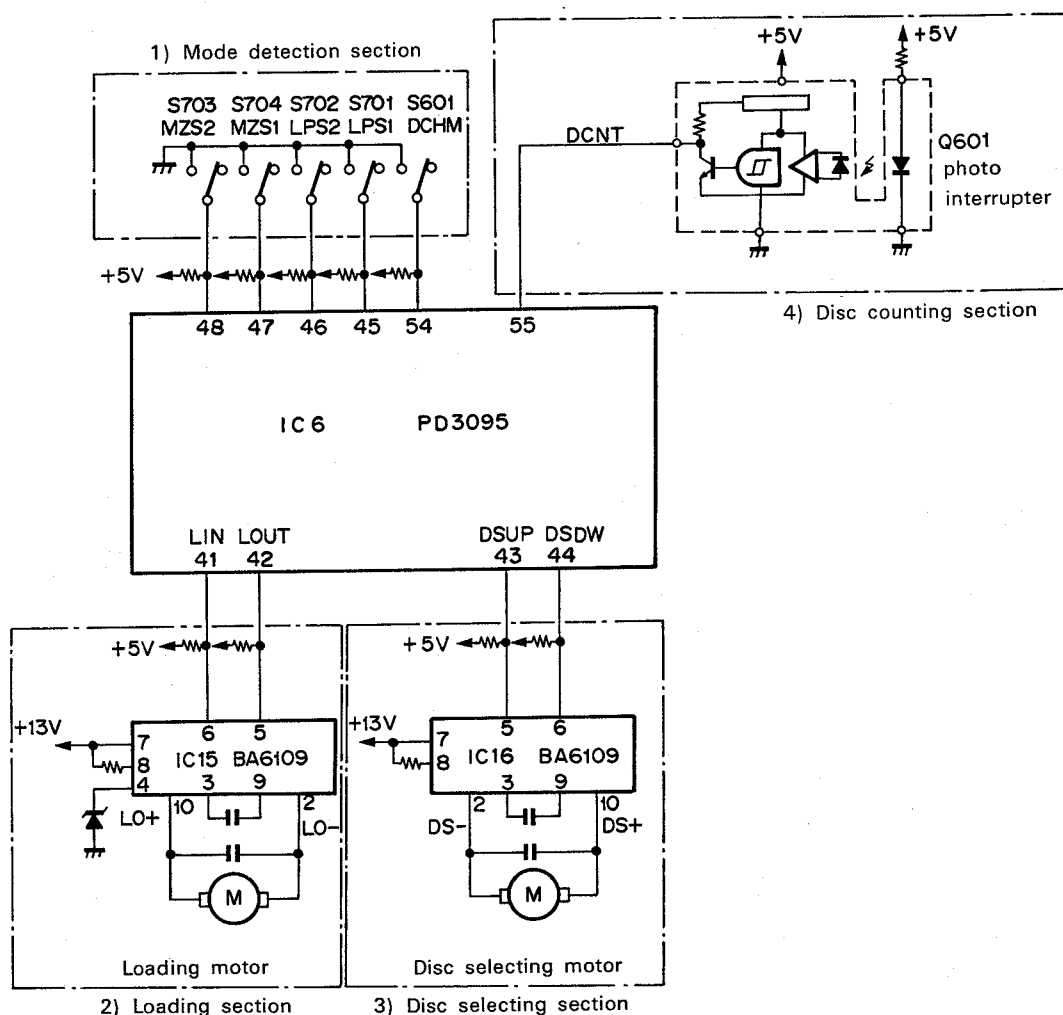


Fig. 5-1 Circuit block diagram

Descriptions of each section appear below.

5.2 Mode Detection Section

The block which detects the mode from the respective SWs and introduces to the input port of the system control microcomputer IC6.

MZS1 } Existence / Non-existence of magazine and detection of kinds
MZS2 }

H	L	L
L	H	L
Magazine is non-existent	6-sheet magazine	1-sheet magazine

LPS1 } Loading mode detection
LPS2 }

H	L	L	H
H	H	L	L
STOP	During loading	Clamp mode	During ejection

DCHM

Home detection of disc selection mechanism

H	L
Home position	Others

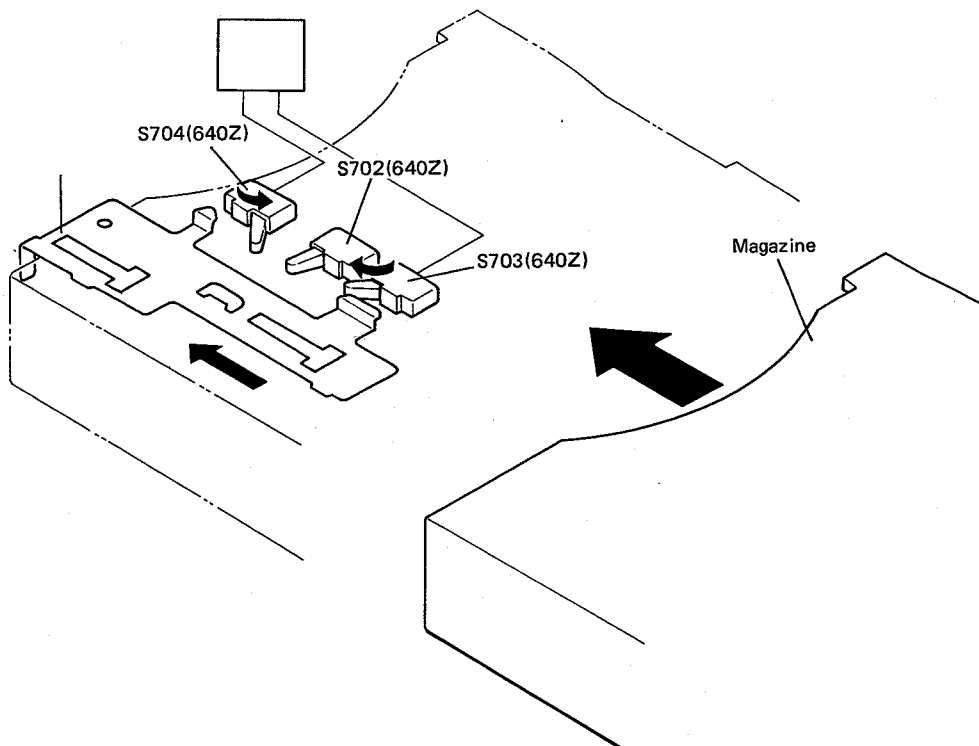


Fig. 5-2

5.3 Disc Selection Section

It consists of the disc selecting motor, which moves the loading mechanism section and clamp mechanism section up and down by adjusting them to the tray position, in order to select an arbitrary tray from the magazine, motor driver IC16, and system control microcomputer IC6.

Assuming that the direction to operate the loading mechanism section and clamp mechanism section from the first sheet to the sixth sheet of the 6-sheet magazine is normal rotation direction and the reverse direction is the reverse rotation direction, the motor is driven with the following logic.

	Motor normal rotation	Motor reverse rotation	Stop
DS UP IC6 43PIN	H	L	H
DS DW IC6 44PIN	L	H	H
DS+IC16 10PIN	L	+V _{cc}	L
DS-IC16 2PIN	+V _{cc}	L	L

+V_{cc}: Motor control voltage

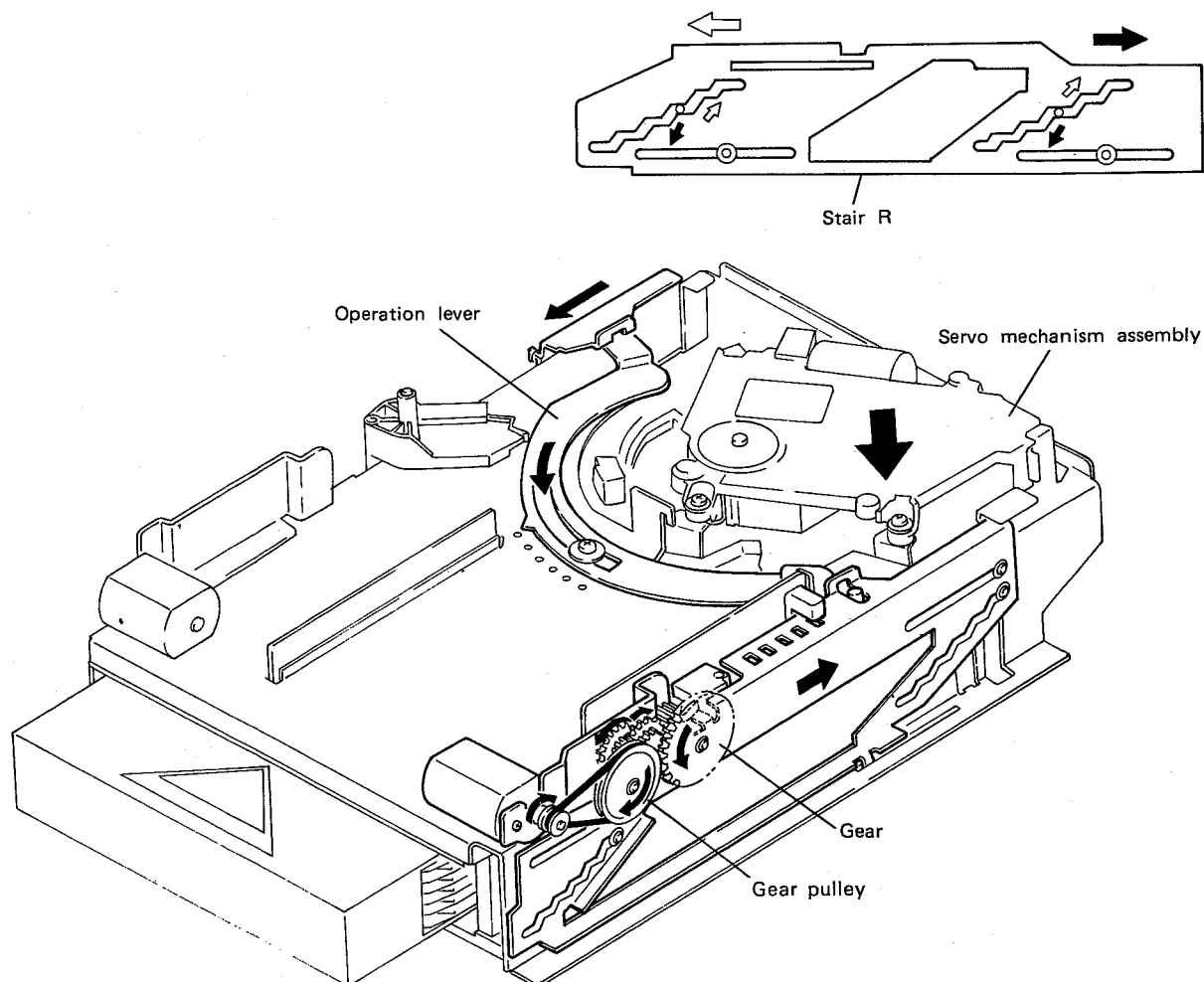


Fig. 5-3

5.4 Disc Counting Section

When the loading mechanical section moves up and down due to the disc selection motor, simultaneously the Q601 photo interrupter detects the positions of the first tray to sixth tray.

The tray position is detected through the windows of the stair which are provided between the photo interrupter and the slits.

When this counted number and the selected disc number are matched, the disc selection motor is stopped.

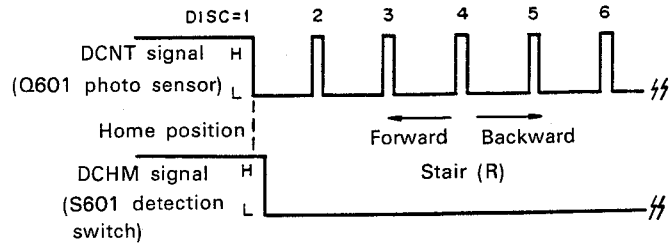


Fig. 5-4 Disc count pulse

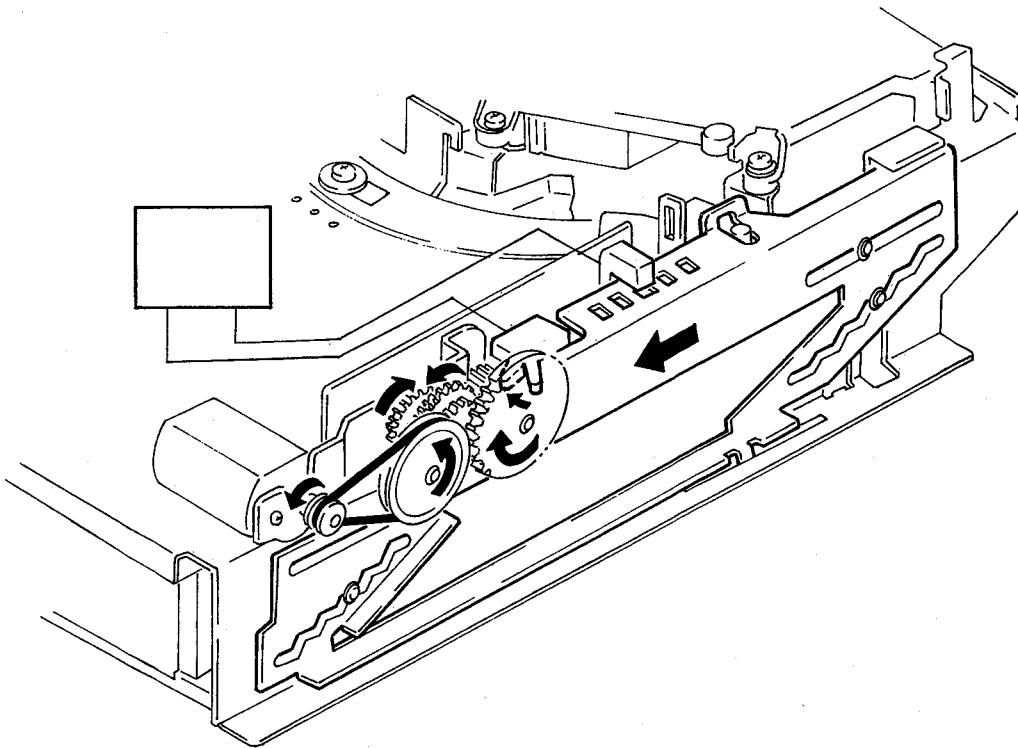


Fig. 5-5

5.5 Loading Section

The loading motor performs the following operations:

- ① Pulls out an arbitrary tray from the magazine and sets the disc to clamp mode.
- ② Restores the disc, which has been in the clamp mode, to the tray and stores in the magazine.
- ③ Ejects the magazine from the main body.

① is performed by turning the loading motor normally.
② and ③ are performed by turning the loading motor reversely. This operation is to receive the binary of logic, which is output from pins 41 and 42 of the system control microcomputer IC 6, and to output the motor control voltage from the output pin of IC15.

	Motor normal rotation	Motor reverse rotation	Stop
L IN IC6 41PIN	H	L	H
L OUT IC6 42PIN	L	H	H
LOAD+IC15 10PIN	+V _{cc}	L	L
LOAD-IC15 2PIN	L	+V _{cc}	L

+V_{cc}: Motor control voltage

Operation ① becomes completed when LPS2 (S702) becomes "L" from "H" (clamp mode).

Operation ② becomes completed when LPS1 (S701) becomes "H" → "L" → "H" (loading home position).

Operation ③ becomes completed when LPS2 becomes "H" by rotating the loading motor normally after rotating it reversely until it becomes "H" at MZS1 (S704) and becomes "L" at MZS2 (S703).

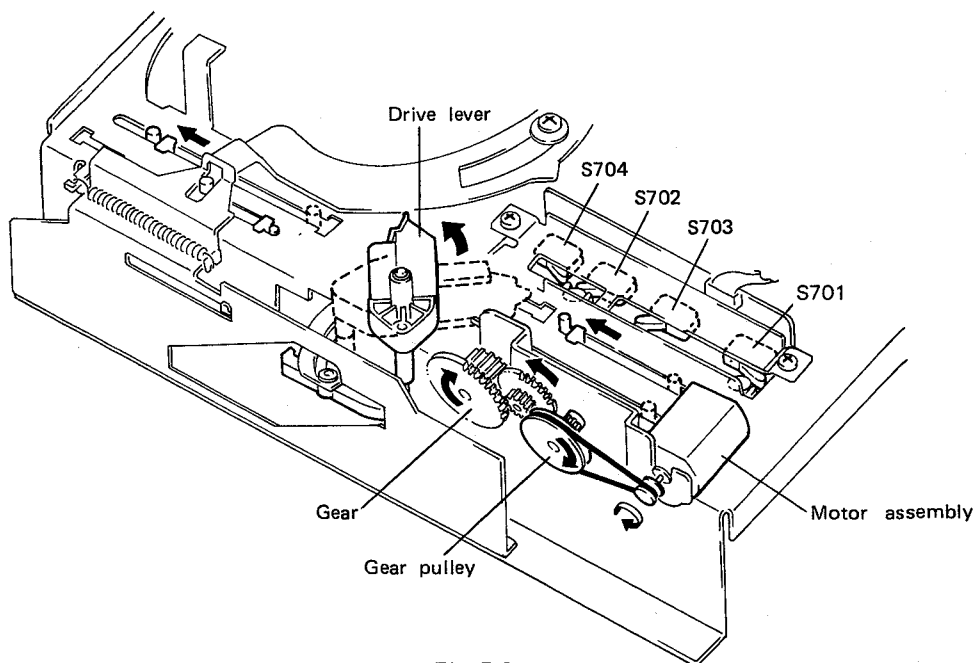


Fig. 5-6

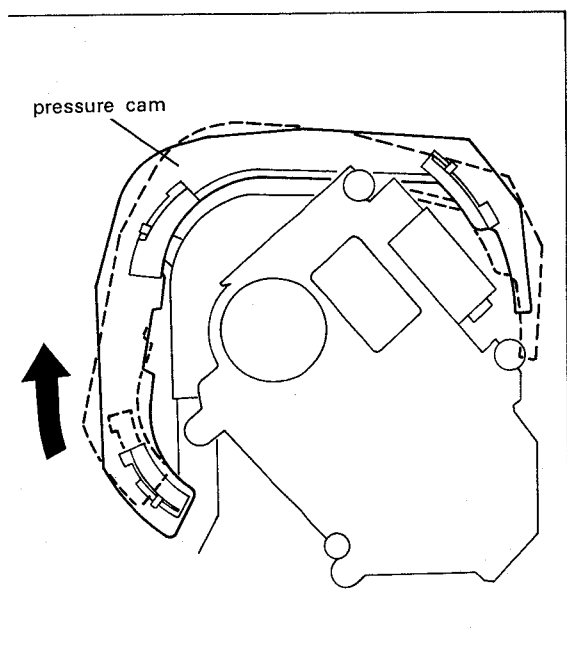


Fig. 5-7

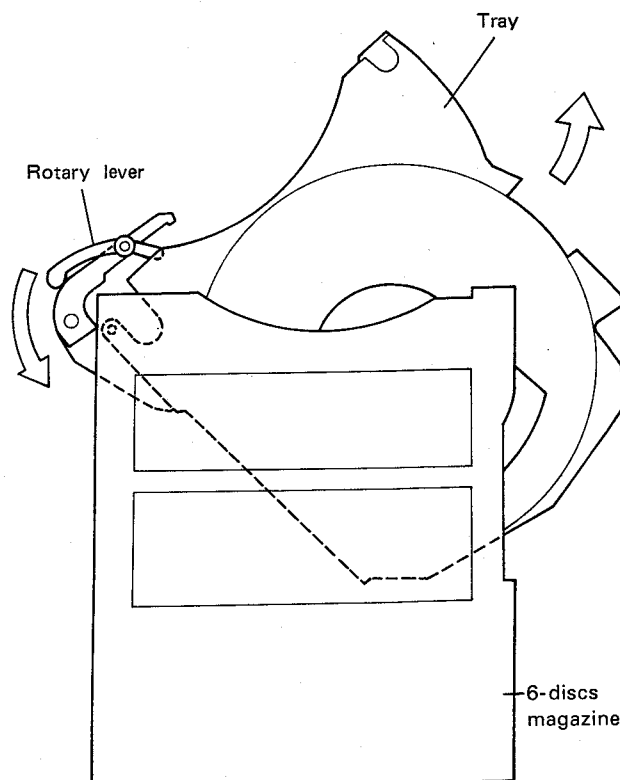


Fig. 5-8

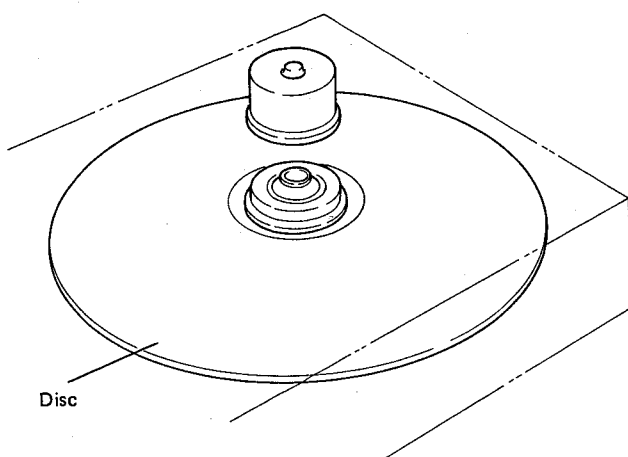


Fig. 5-9

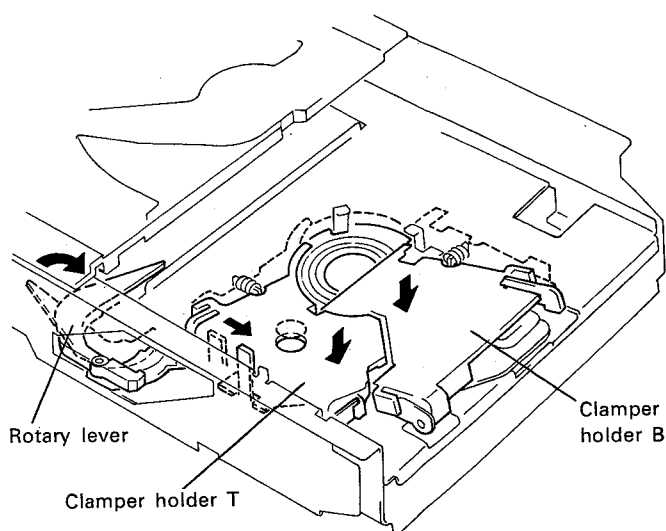


Fig. 5-10

5.6 Eject operation

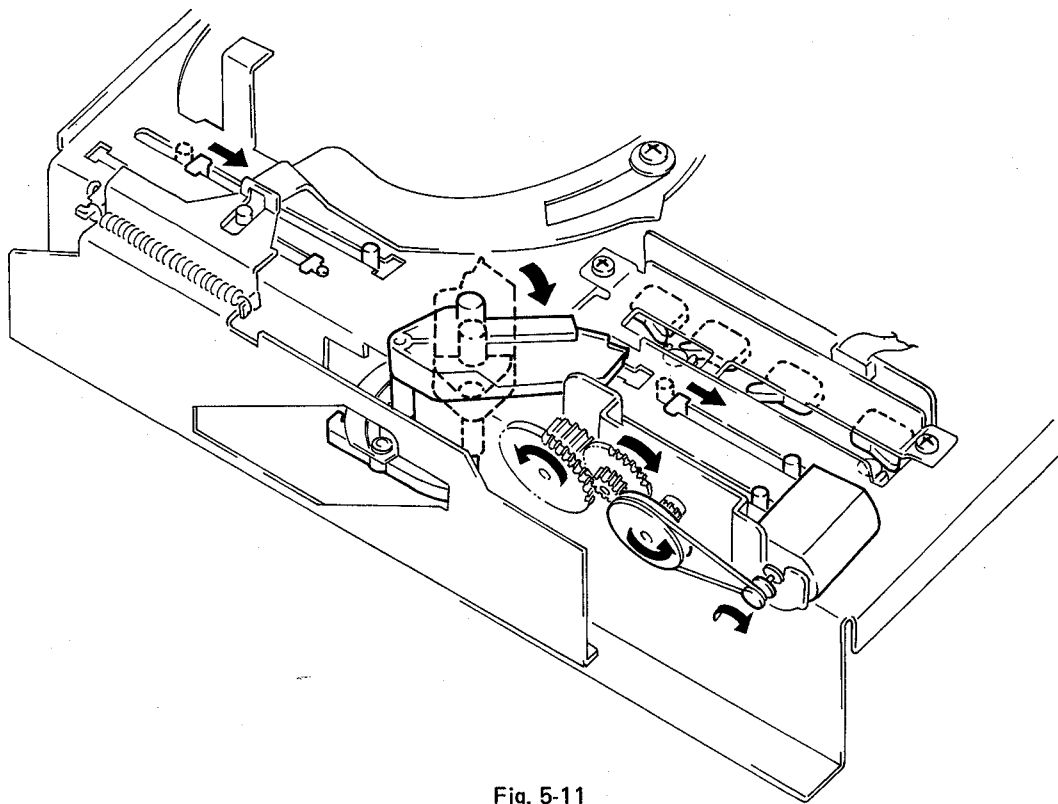


Fig. 5-11

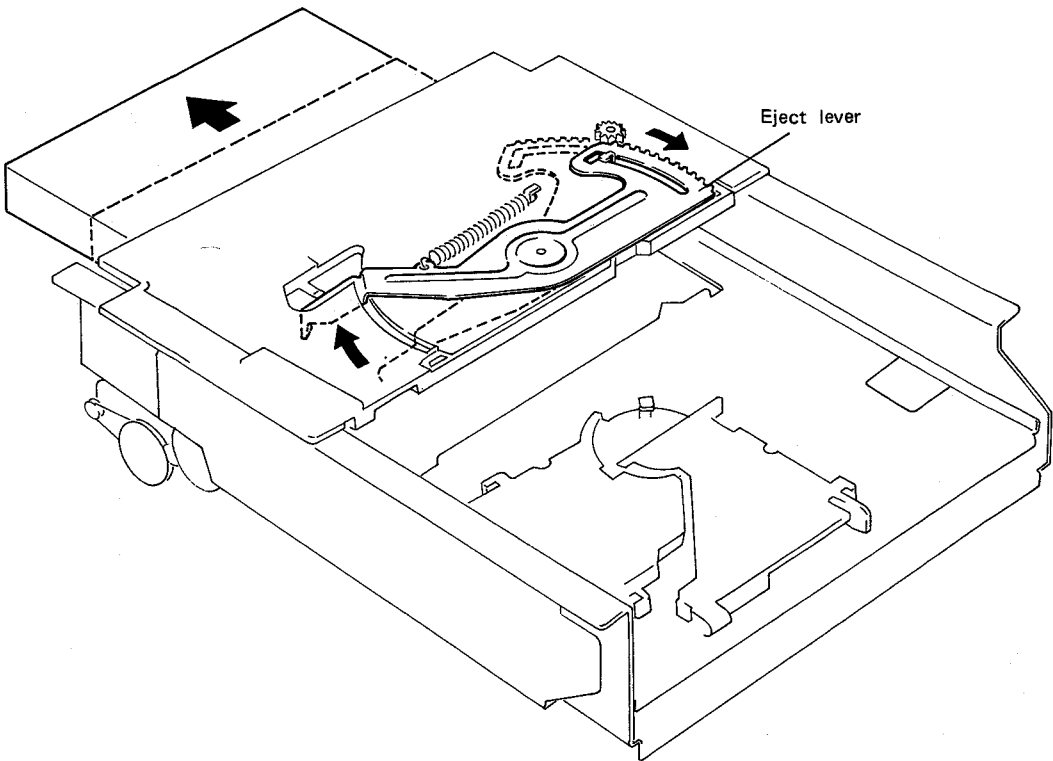


Fig. 5-12

6. DESCRIPTION OF OPERATIONS

This section describes the operation of the mechanisms in its procedures and flow charts in accordance with actual operations.

6.1 PLAY PROCEDURE

1. A desired disc is selected by the operation buttons.
2. The disc selector motor is switched on, and Stair (L) and Stair (R) begin moving forward and backward.
3. The servo mechanism moves up and down by actions of its subchassis's projection along with the cam grooves of Stair (L) and Stair (R) and the chassis guide groove.
4. The servo mechanism stops at the predetermined disc position.
5. The loading motor starts rotating, moving the rack backward.
6. The driving plate (locked to the rack) and driving lever move.
7. The rotary lever moves, protruding the tray from the magazine.
8. The disc moves to the concentric position on the disc holding face of the disc table.
9. As the rack moves further (At this point, the rack is released from the driving plate and locked onto the differential plate), the differential plate and clamp cam move, and clamp holders T and B move toward the disc table, thus lifts the disc. At the same time, the disc is clamped onto the disc table (this is shown as Disk Load in the flow chart in Fig. 6-2).
10. Movement of the clamp cam causes the push cam to move, raising the upper tray with disc. When the disc is loaded on the disc table, the upper tray makes a small space between the disc so that it does not affect disc rotation.
11. Starts playing
As the operation from the end of play to returning the disc to the magazine is simply a reverse of the loading operation, the description is omitted here.

6.2 FLOW CHART

Fig. 6-2 shows the flow chart of the disc selection operation focusing on the movement of Stair (R) and the DCNT (Q601) and DCHM (S601) signals.

- ① For starting of disc selection, the system control IC (IC6) performs operation of current disc select position and disc search, then depending on the results, the selector motor is rotated in either the forward or reverse direction, moving Stair (R) forward or backward, accordingly. As Stair (R) moves, the DCNT signal is sent from Q601 to IC6, counting L → H cycles, and the servo mechanism moves to the disc search.
- ② If the DCNT signal (Q601) is "L" at the time select operation begins (i.e. the servo mechanism is midway between 1~6 disc positions), the servo mechanism returns until the DCHM signal is changed to "H" (i.e. until it returns to the home position, Stair (R) is moved forward), then operation ① begins.

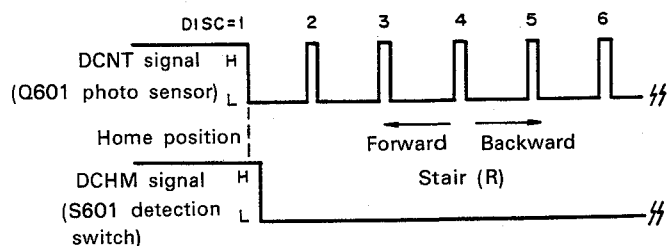


Fig. 6-1 Timing chart of Stair (R) movement

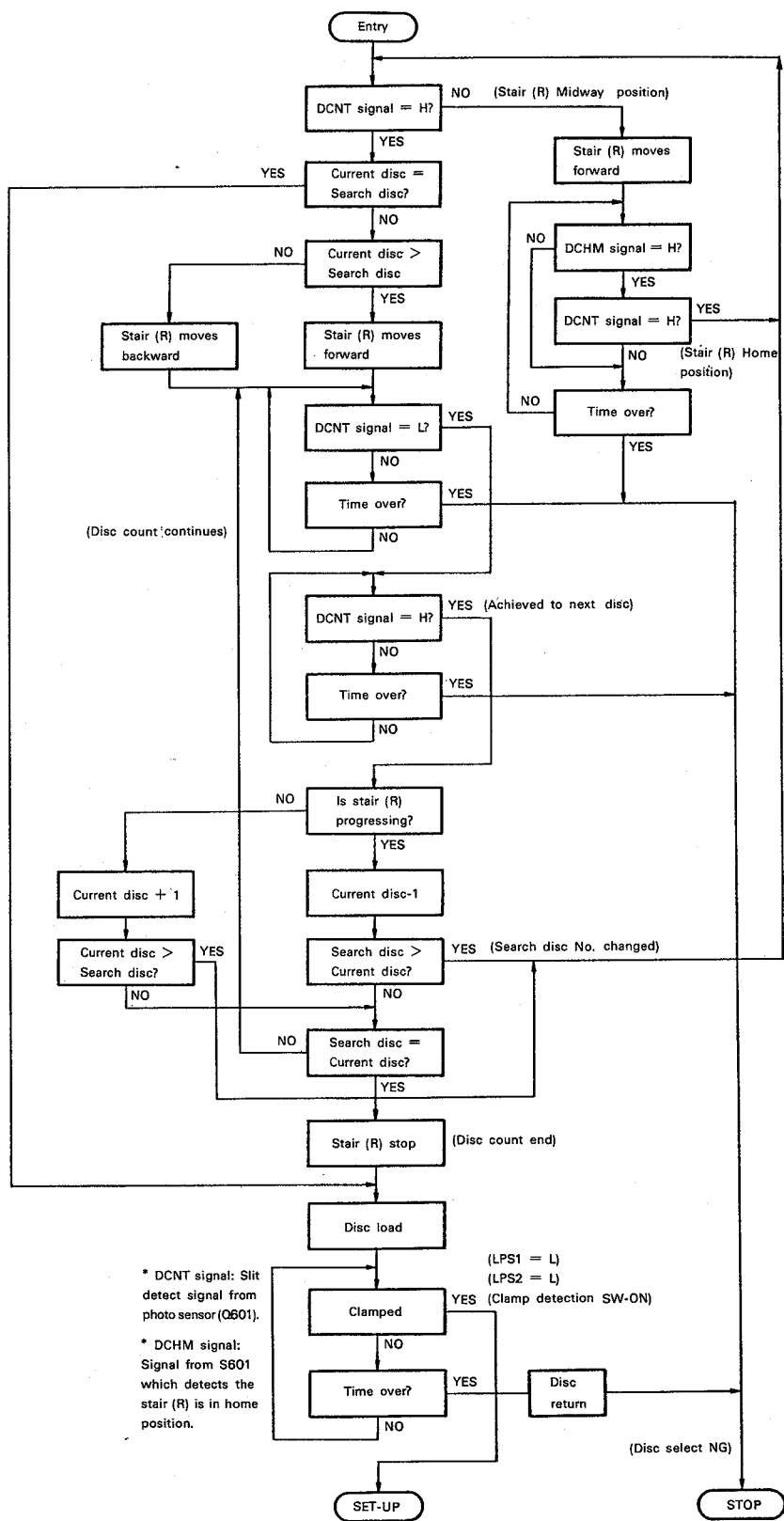
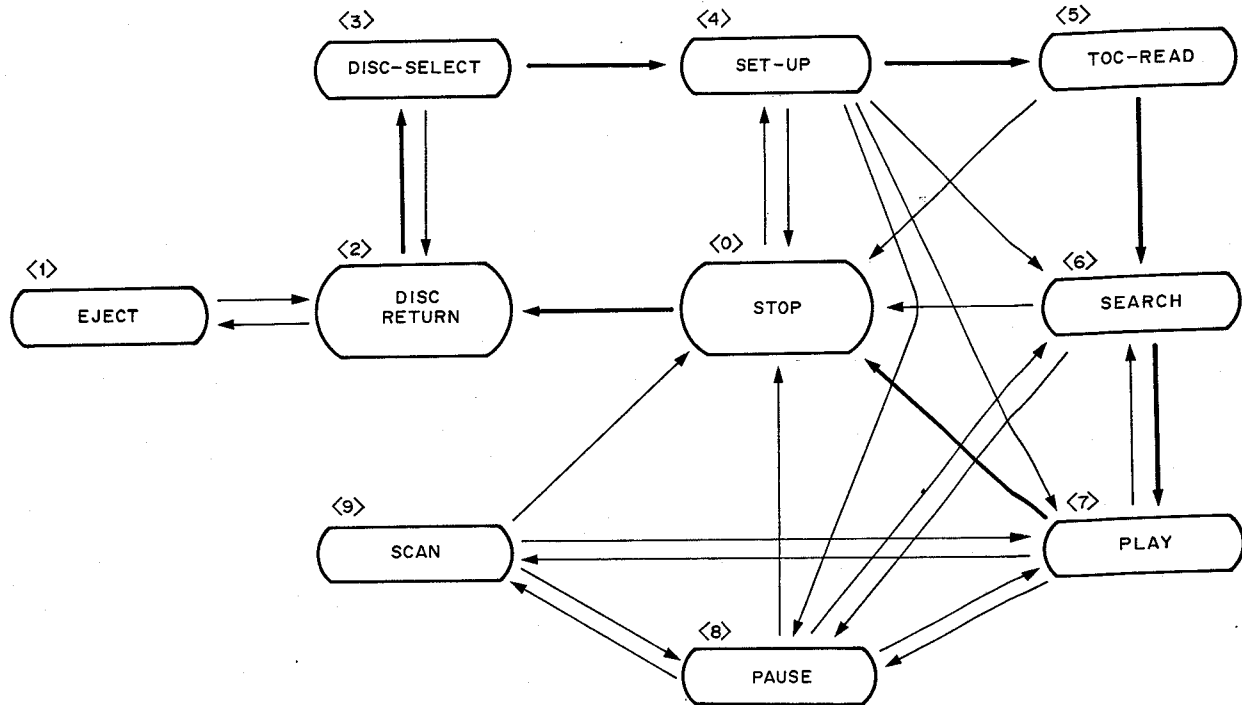
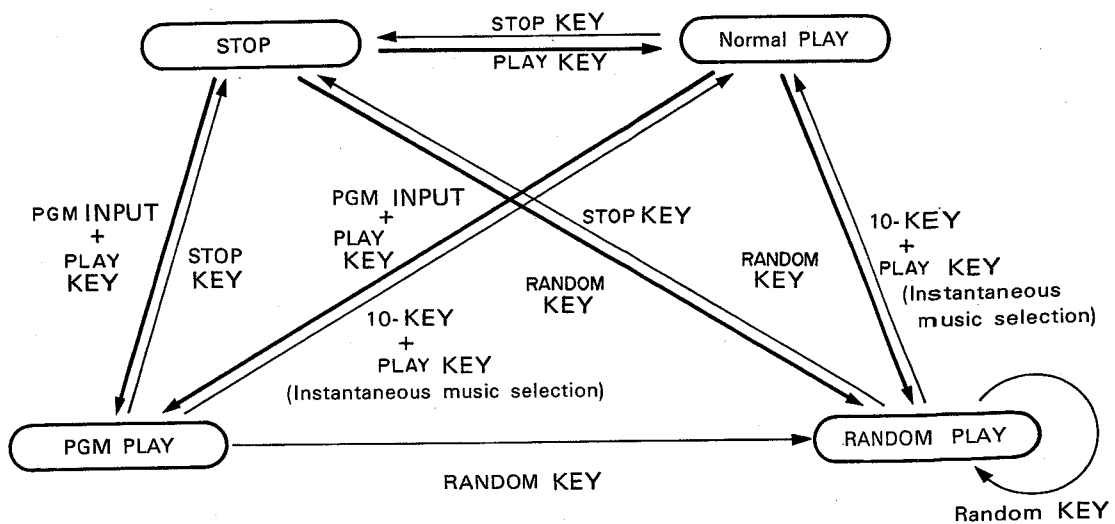


Fig. 6-2 Flow chart

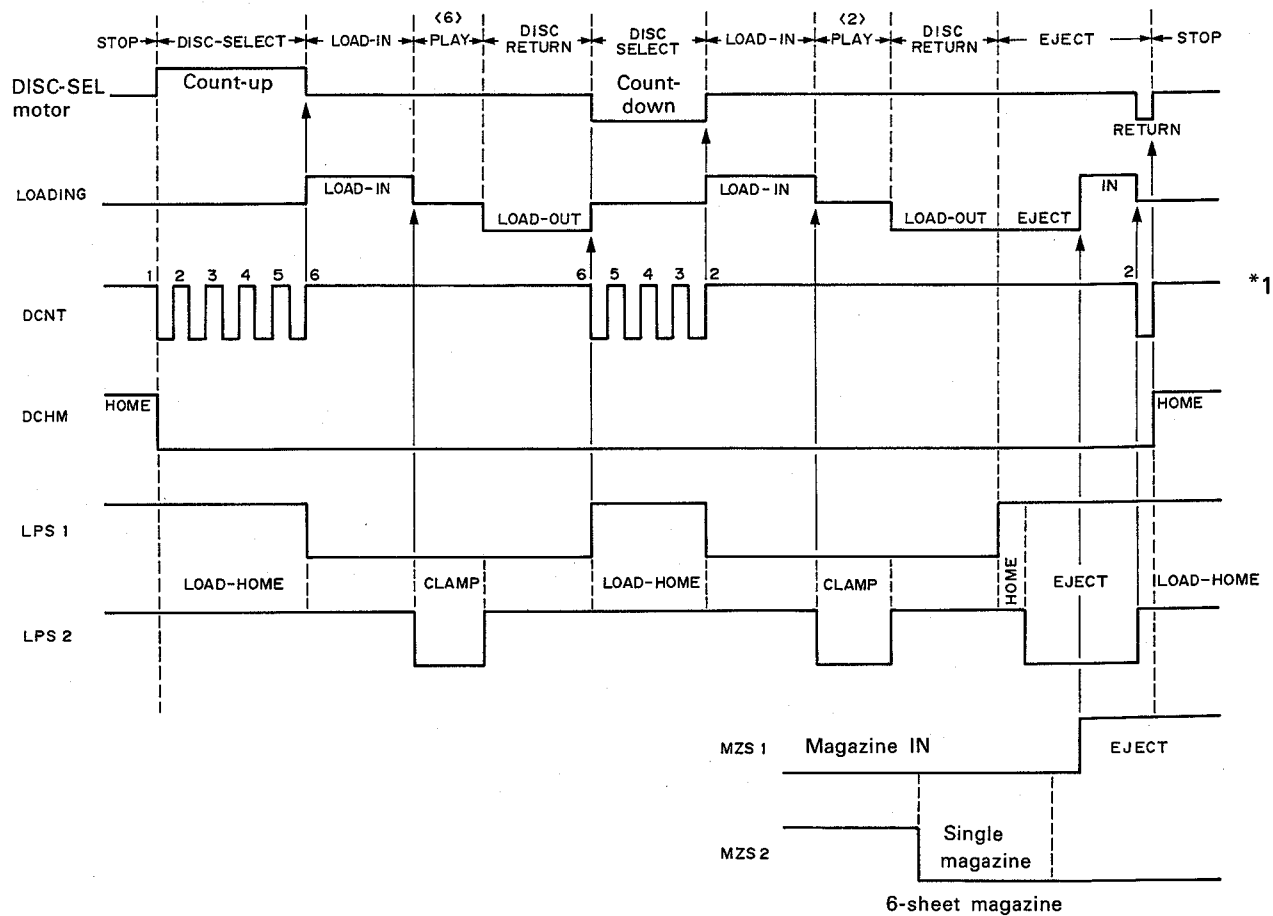
Multi-CD-Player Mode Transition Diagram



Multi-CD-Player Play Mode Transition Diagram



DISC-SELECT/RETURN/EJECT Operation Chart

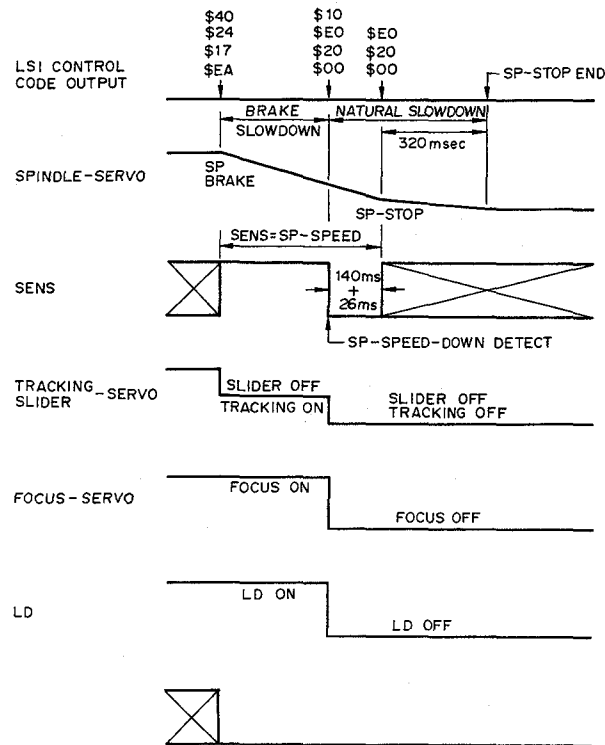


Note: MZS2 has no correlation with signals LPS1 and LPS2.

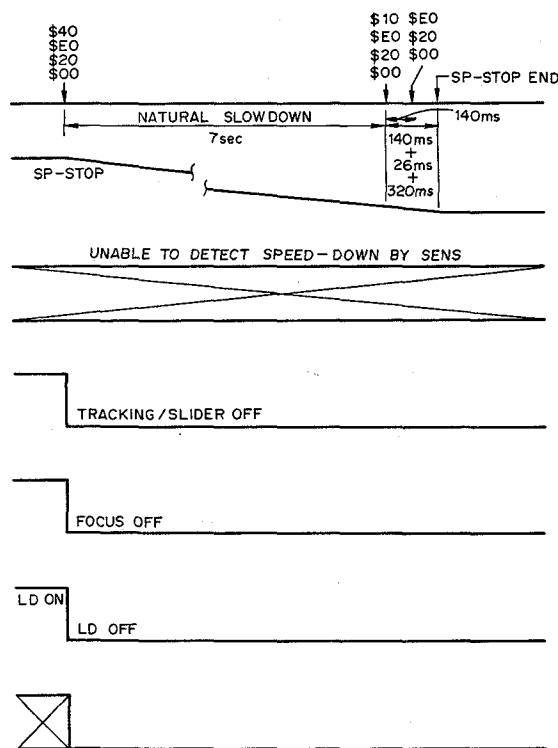
*1 : When starting count, if it is DCNT=L, recount by returning to HOME.

STOP Mode Timing Chart

(1) Normal stop (During GFS locking)

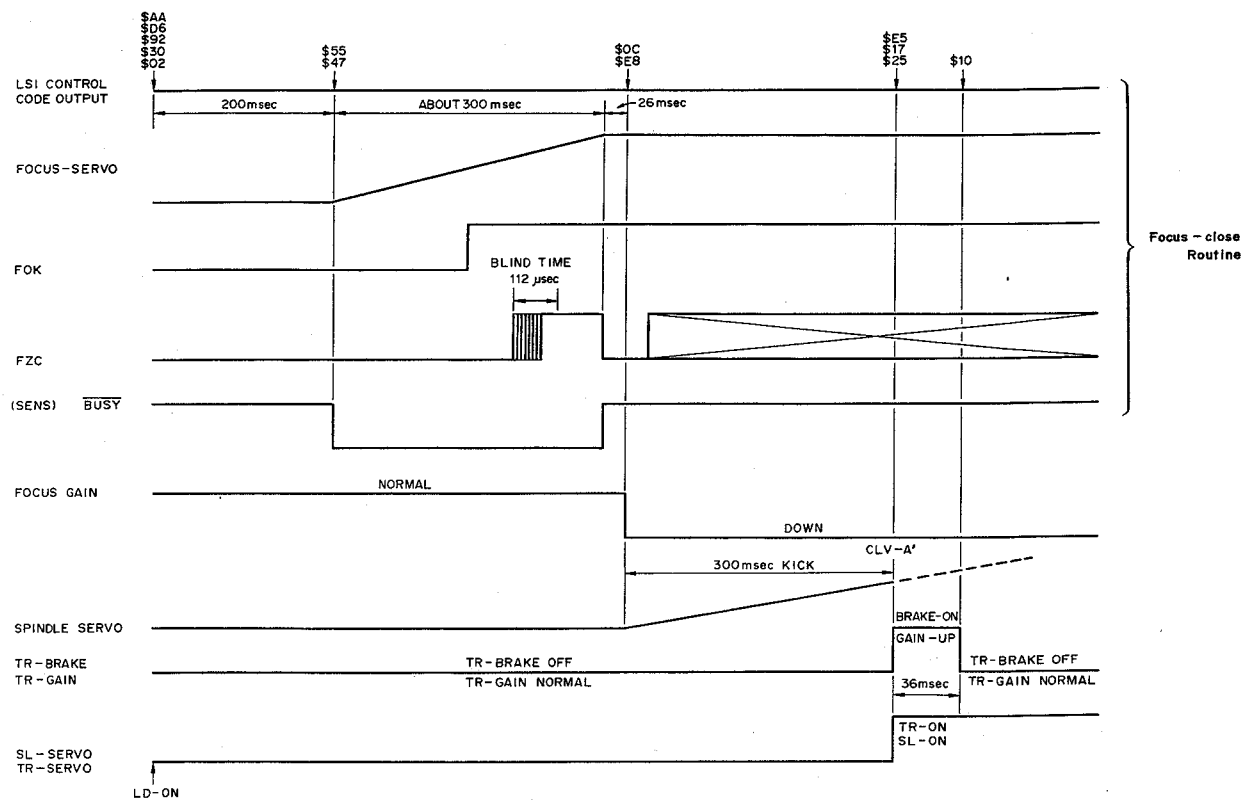


(2) Abnormal stop (GFS-NG or FOCUS deviation)

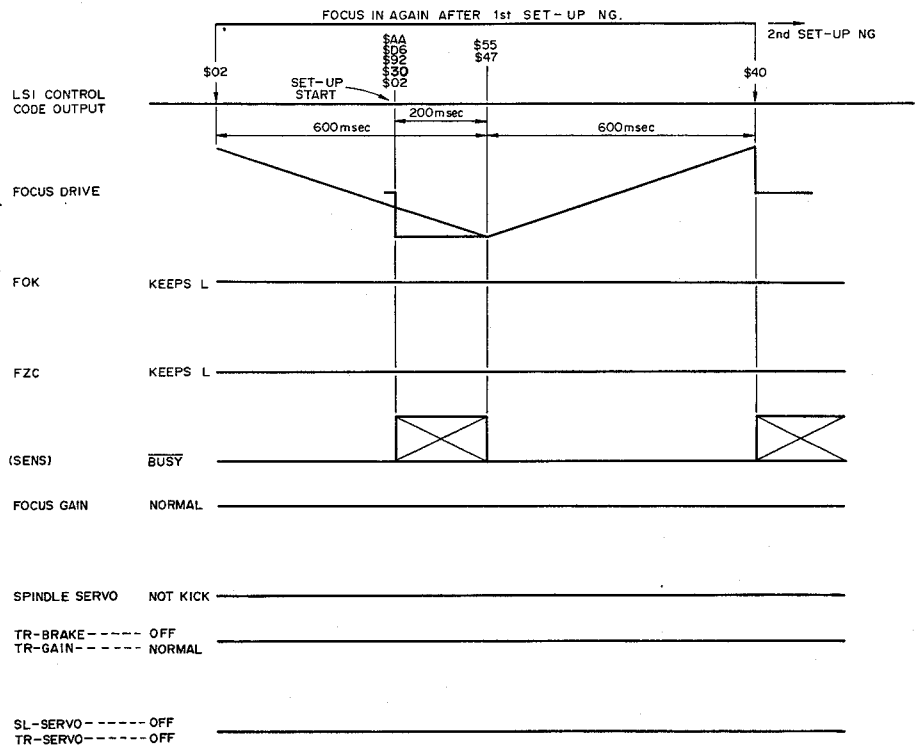


- (Notes)
- Refer to FLOW CHART and PROGRAM DESCRIPTION.
 - H/L in this timing chart are only for convenience sake, not the actual port's output etc.

SET-UP Mode Timing Chart

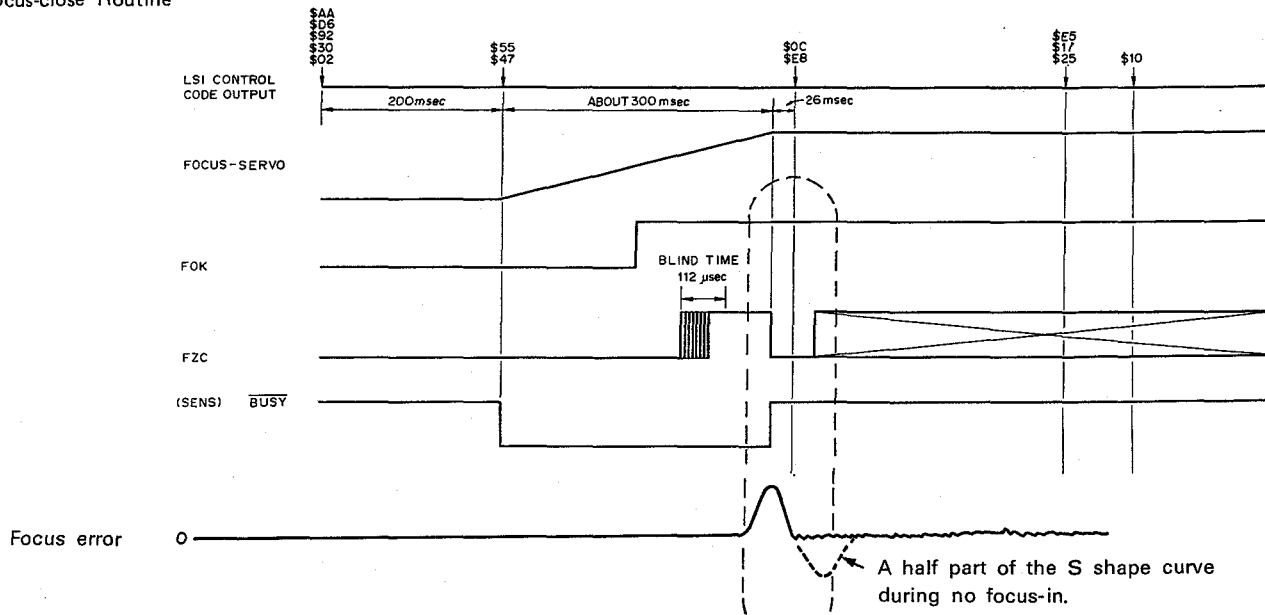


SET-UP TIMING CHART (IN CASE OF N.G)

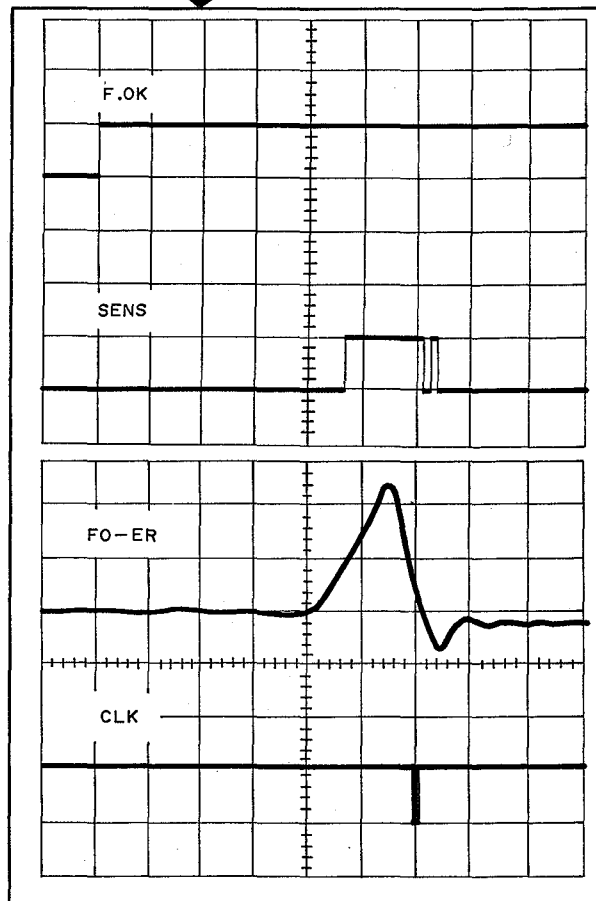


- (Notes)
- Refer to FLOW CHART and PROGRAM DESCRIPTION.
 - H/L in this timing chart are only for convenience sake, not the actual port's output etc.

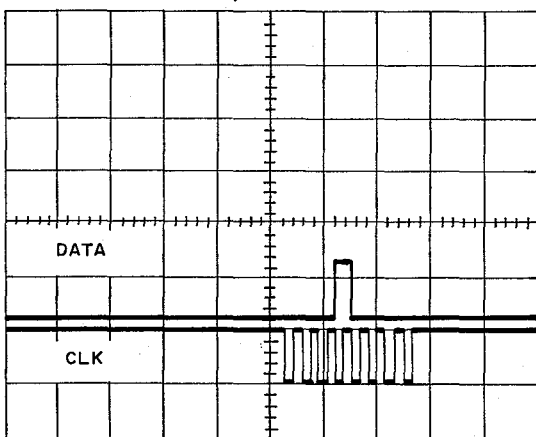
Focus-close Routine



V: 500 mV/div, H: 1 mS/div

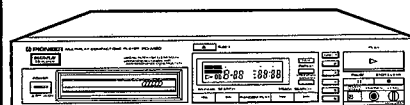


V: 500 mV/div, H: 50 μ s/div



Enlargement of CLK

Service Manual



ORDER NO.
ARP1342

MULTI-PLAY COMPACT DISC PLAYER

PD-M50

PD-M40

PD-M40-S

MODEL PD-M50, PD-M40 AND PD-M40-S COMES IN SEVEN VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Applicable model			Power requirement	Export destination
	PD-M50	PD-M40	PD-M40-S		
KU	○	○	—	AC120V only	U.S.A
KC	○	○	—	AC120V only	Canada
HEM	○	○	○	AC220V, 240V (switchable)*	European continent
HB	○	—	—	AC220V, 240V (switchable)*	United kingdom
HP	—	○	—	AC220V, 240V (switchable)*	Australia
SD	○	○	—	AC110V, 120-127V, 220V, 240V (switchable)	General market
SD/G	○	—	—	AC110V, 120-127V, 220V, 240V (switchable)	U.S.Military

* Change the primary wiring, please refer to pages 77 or 81.

- This service manual is applicable to the PD-M50/KU, KC, HEM, HB, SD, SD/G, PD-M40 and PD-M40-S types.
- As to the PD-M50/KC, HEM, HB, SD and SD/G types, please refer to pages 76.
- As to the PD-M40/KU, KC, HEM, HP, SD and PD-M40-S/HEM types, please refer to pages 78.
- Ce manuel d'instruction se réfère au mode de réglage, en français.
- Este manual de servicio trata del método ajuste escrito en español.

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan

PIONEER ELECTRONICS SERVICE INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.

PIONEER ELECTRONICS OF CANADA, INC. 505 Cochrane Drive, Markham, Ontario L3R 6B8 Canada TEL: [416] 479-4411

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1. SAFETY INFORMATION

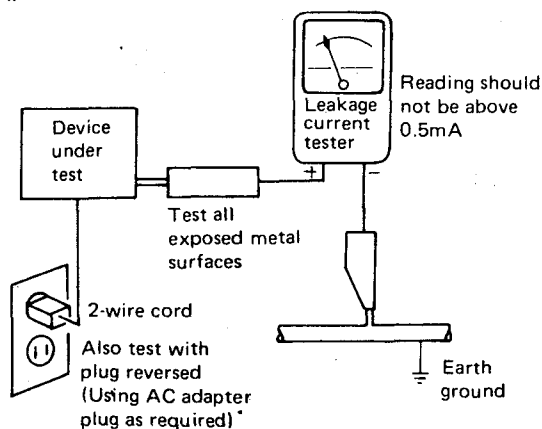
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

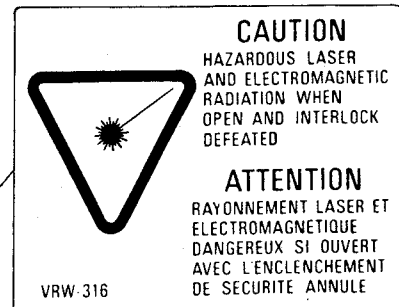
Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

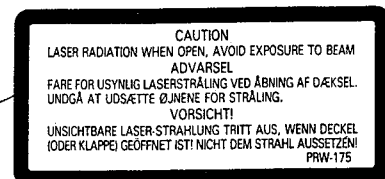
Product safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, the PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

LABEL CHECK

KC model



HEM model



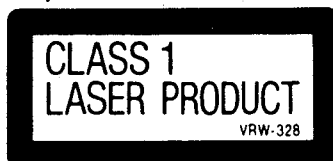
HEM, HB and HP models



Additional Laser Caution

1. ON/OFF (L/H) MODE OF THE LOADING STATE DETECTION SWITCHES, LPS1 (S701) AND LPS2 (S702), ARE DETECTED WITH THE SYSTEM MICROCOMPUTER. LASER DIODE DOESN'T OSCILLATES UNLESS THESE SWITCHES ARE BOTH ON (L), THAT IS CLAMPED STATE. CONSEQUENTLY, IF THESE SWITCHES ARE SHORT-CIRCUITED ON PURPOSE, THE INTERLOCK IS INVALID. WHEN PINS ④, ⑤ OR ②⑨ OF CXA1081S (IC1) IS SHORT-CIRCUITED TO GND, OR BETWEEN RESPECTIVE PINS OF Q1 ARE SHORT-CIRCUITED (FAULT CONDITION), THE LASER DIODE KEEPS OSCILLATING. IN TEST MODE (REFER TO PAGE 42), THE INTERLOCK MECHANISM DOESN'T OPERATE.
2. AT THE STATE WHICH BONNET IS OPENED, SERVO MECHANISM IS REMOVED AND IT IS TURNED OVER, IF IT IS FAULT CONDITION AND TEST MODE AS DESCRIBED IN ITEM 1, THERE IS THE DANGER TO BE CAUGHT LASER BEAM MORE THAN CLASS 1.

HEM, HB and HP models



HB and HP models



Specifications and design subject to possible modification without notice, due to improvements.

3. PANEL FACILITIES

POWER switch

Press to turn power to the unit ON and OFF.

EJECT key

Press to eject a magazine or the disc tray. When pressed, any magazine (in case of single magazine, the disc tray) inside is expelled forward.

Magazine insertion slot

PLAY key

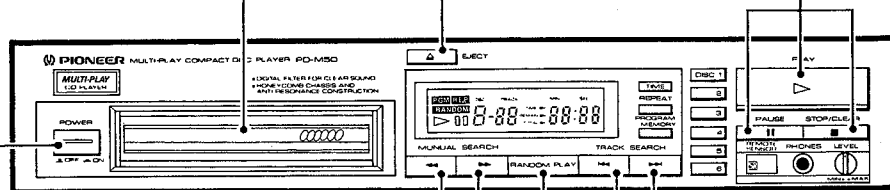
Press to begin playback, and to release the player from the pause mode.

PAUSE key

Press to temporarily interrupt playback. When pressed again, the player is released from the pause mode.

STOP/CLEAR key

Press to stop playback. When pressed, the player goes into stop mode and all operations stop. Press to clear a program. When pressed during stop mode, the program stored in memory is cleared.



MANUAL SEARCH keys

When the player is in play or pause modes, these keys are pressed to perform fast forward or fast backward operations, to allow manual searching. These operations are done only during the time either key is pressed.

[>>] : Fast forward operation (If fast forward operation is performed to the end of the disc, "End" will be indicated and the player will enter the pause mode.)

[<<] : Fast backward operation (If fast backward operation is performed to the beginning of the disc, the player will enter play mode.)

If these operations are performed during programmed play mode, the player will enter the pause mode (or play mode), just before transferring to the next (or previous) step.

TRACK SEARCH keys

When the player is in the normal play, programmed play or pause modes, these keys are pressed to search for a desired track. The player can advance to the beginning of the next track on the disc or program or back track to the beginning of the current or previous track.

[>>] : When pressed once, play restarts at the beginning of the next track on the disc; when pressed continuously, the disc playback shifts to the beginning of succeeding tracks on the disc. (During programmed playback, it moves to the beginning of the next programmed track.)

[<<] : When pressed once, the disc playback returns to the beginning of the currently playing track; when pressed continuously, the disc playback shifts to the beginning of previous tracks on the disc. (During programmed playback it returns to the beginning of the previously programmed track.)

RANDOM PLAY key

Press to begin random playback.

INDICATORS

- PGM** : Lights after programming (after program has been memorized).
- RANDOM** : Lights during random playing.
- REP** : Lights during repeat play.
- DISC** : Indicates disc number (1 - 6) during play or search.
- TRACK** : Indicates track number (01 - 99) during play or search.

TIME/REMAIN/TOTAL

Press TIME key for switching.

TIME: Indicates playing time (min/sec)

REMAIN: Indicates the time remaining on the track being played.

TOTAL: Indicates total playing time (min/sec).

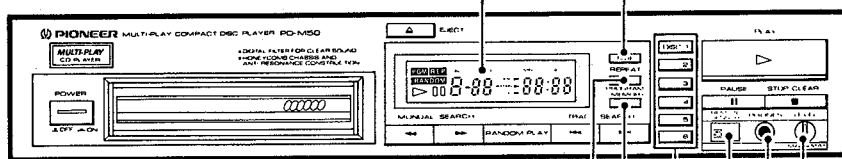
When programming, the total number of steps is indicated.

MIN: Playing or remaining time for the track indicated by the minute.

SEC: Playing or remaining time for the track indicated by the second.

PLAY (▷) : Lights during playback.

PAUSE (⏸) : Lights during pause mode, when playback is temporarily interrupted.



TIME key

- Use to select the method for displaying the playing time on the indicator panel. Each time the key is pressed, the indication changes from TIME, and REMAIN (track remain) to TOTAL in that order. (For details concerning the display contents, refer to the explanation about the indicators.)

REPEAT key

Press to perform repeat playback.

- If pressed during normal playback mode, all tracks on the inserted disc will be played back repeatedly.
- If pressed during programmed playback, the programmed tracks will be repeatedly played back in the programmed order.
- In the case of random play mode, after all the tracks have been played, random play will start again.

REMOTE SENSOR window

DISC NO. keys (DISC NUMBER 1 - 6)

Use to select disc numbers for playback or programming.

PGM MEMORY key (PROGRAM MEMORY)

Use to program a sequence of tracks.

- Press this key after selecting a desired disc and track with disc and TRACK SEARCH keys. Tunes will be added to the program in the order in which they are specified.
- If only a DISC NO. key is pressed, all tracks on the specified disc will be added to the program. The letters AL will appear on the indicator.

PHONES (headphones) jack

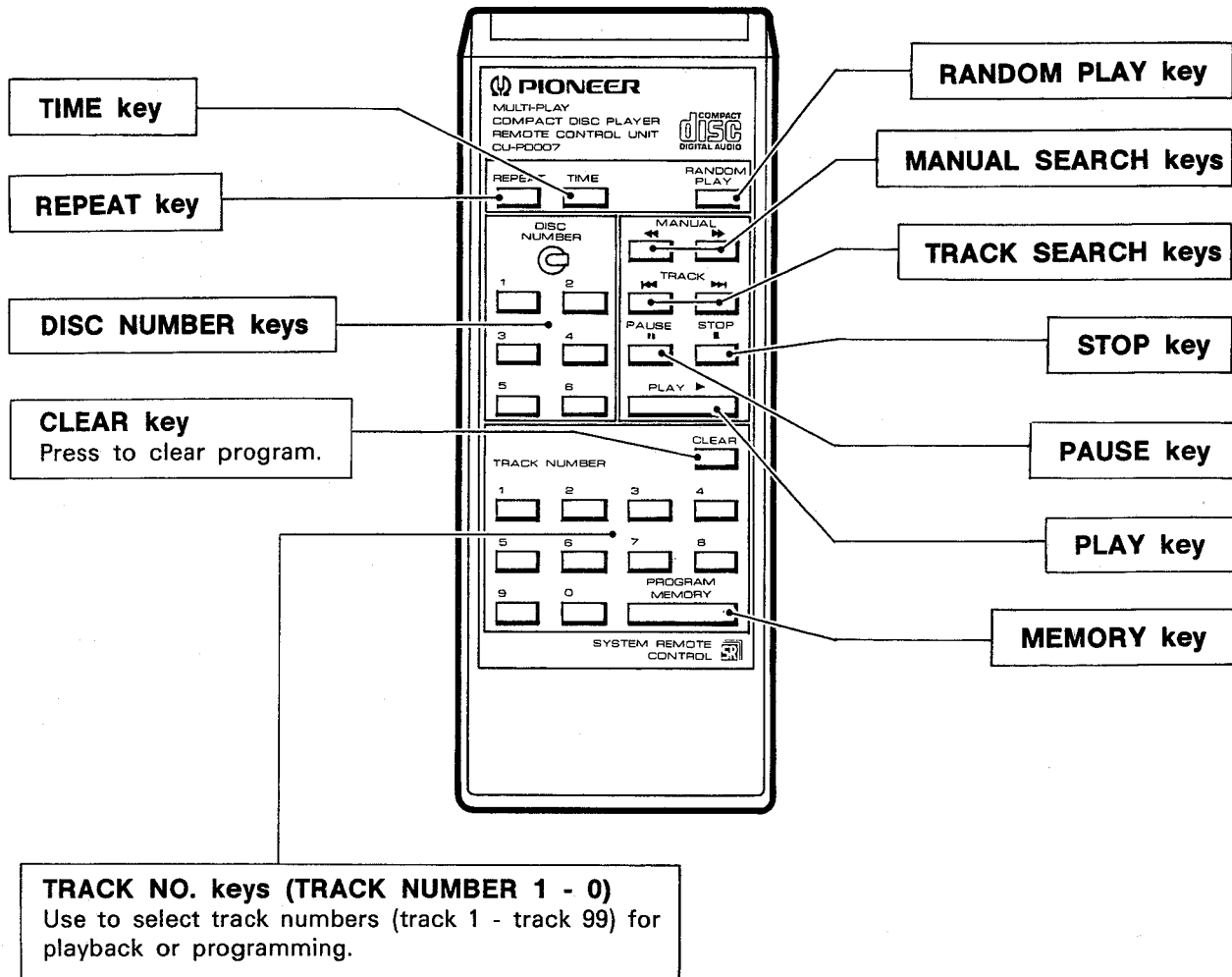
When you wish to use headphones, insert the plug for the headphones into the headphones jack.

PHONES LEVEL control knob

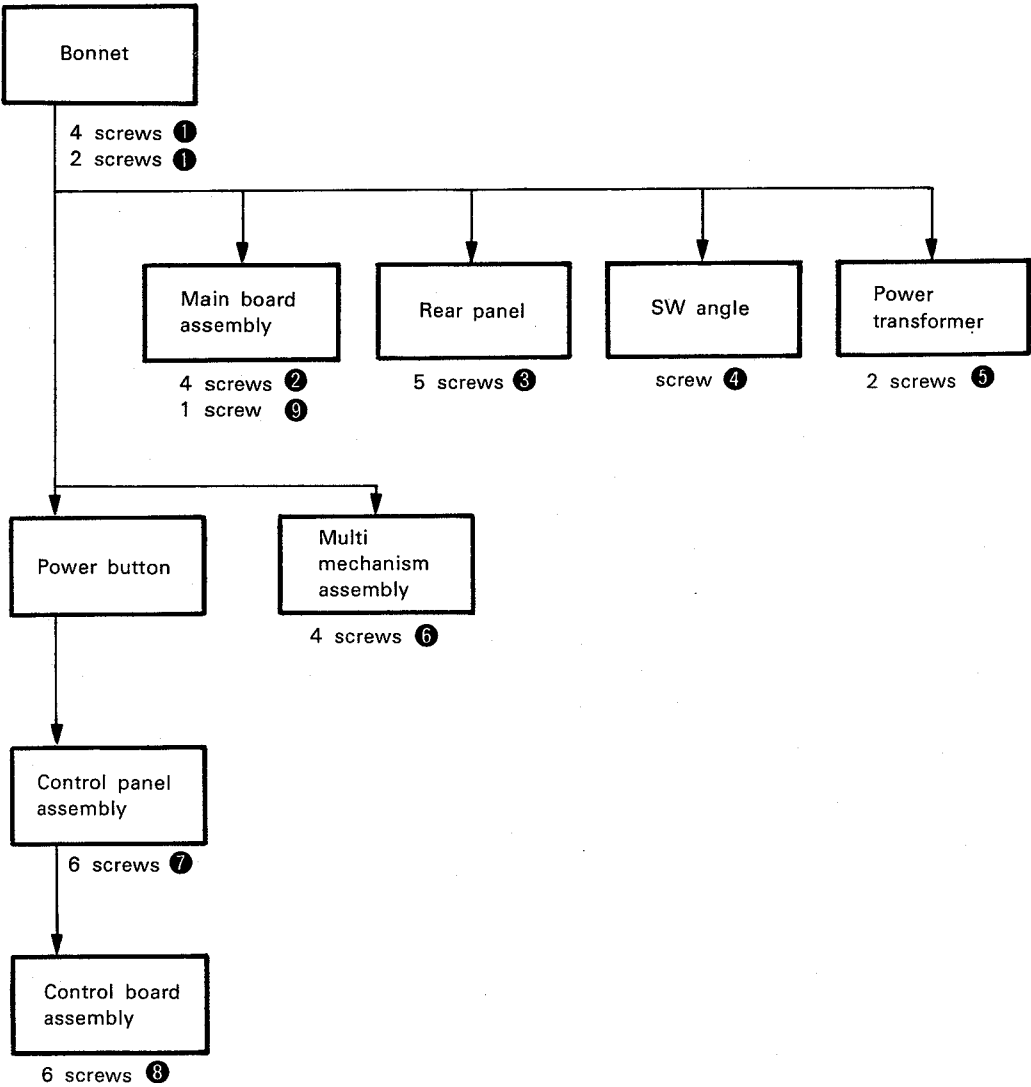
Use to adjust the level of sound when using headphones. Turning the knob to the right increases the sound level.

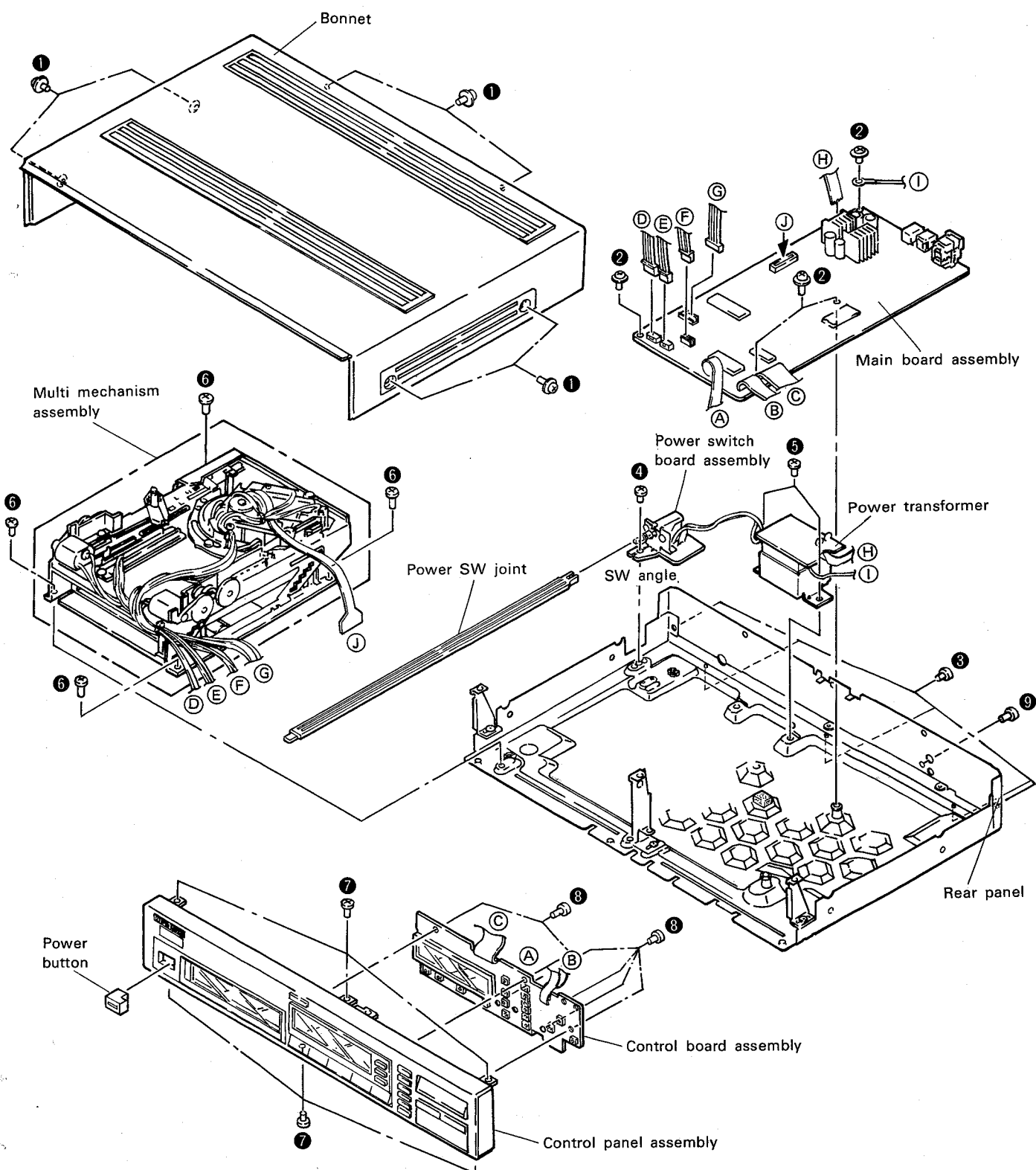
REMOTE CONTROL UNIT

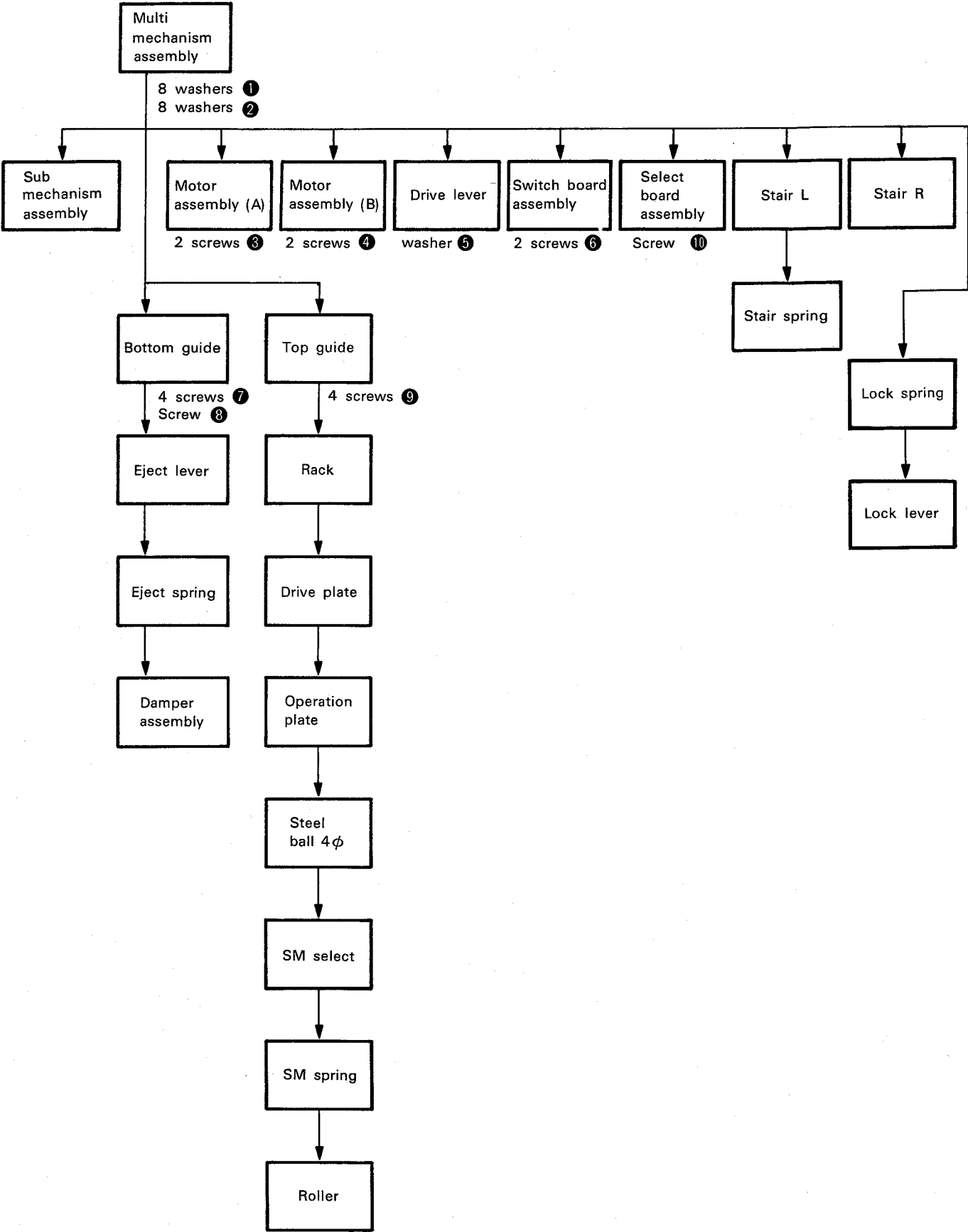
Refer to the player front panel section for information regarding other key functions not specified here.

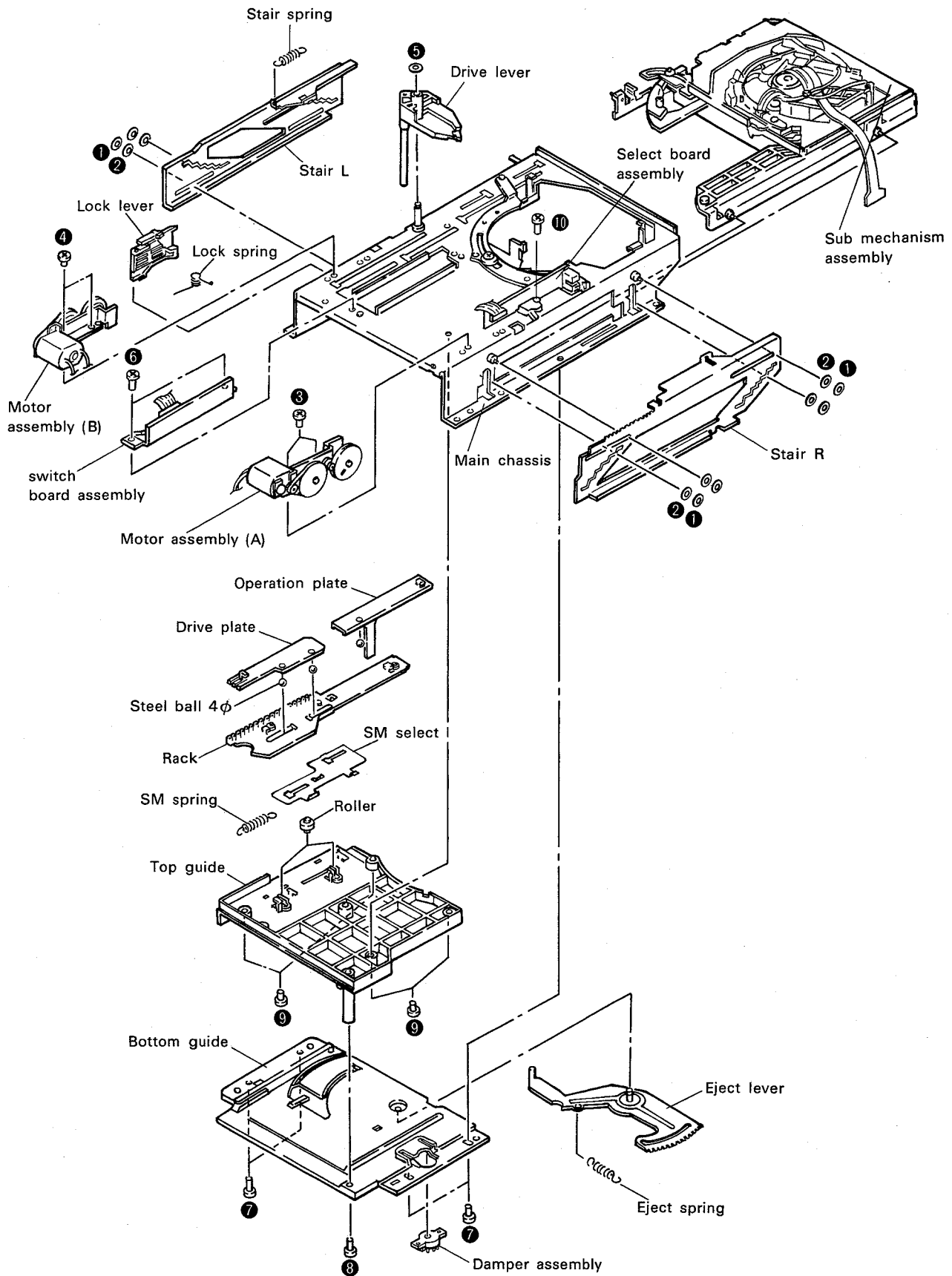


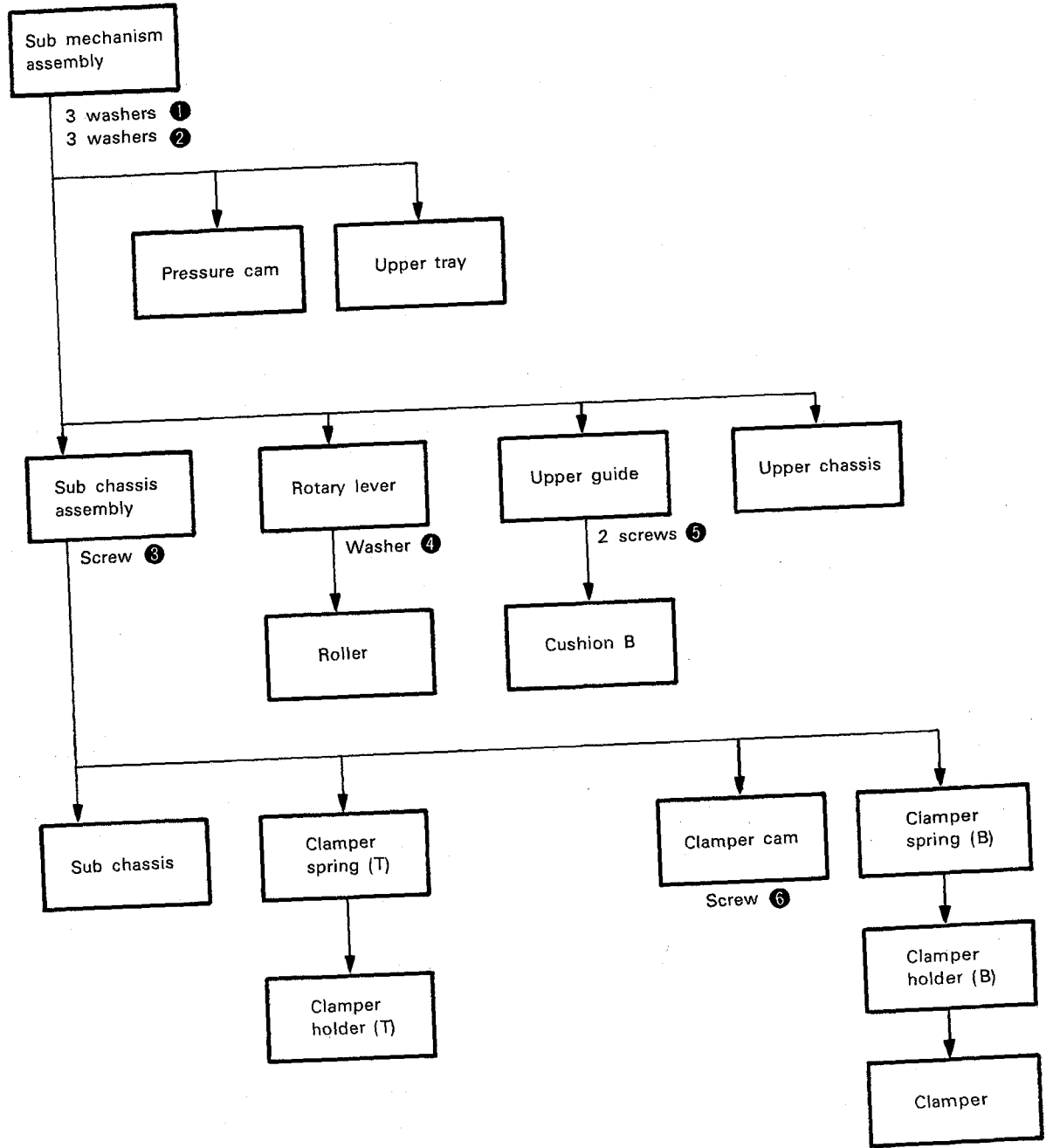
4. DISASSEMBLY

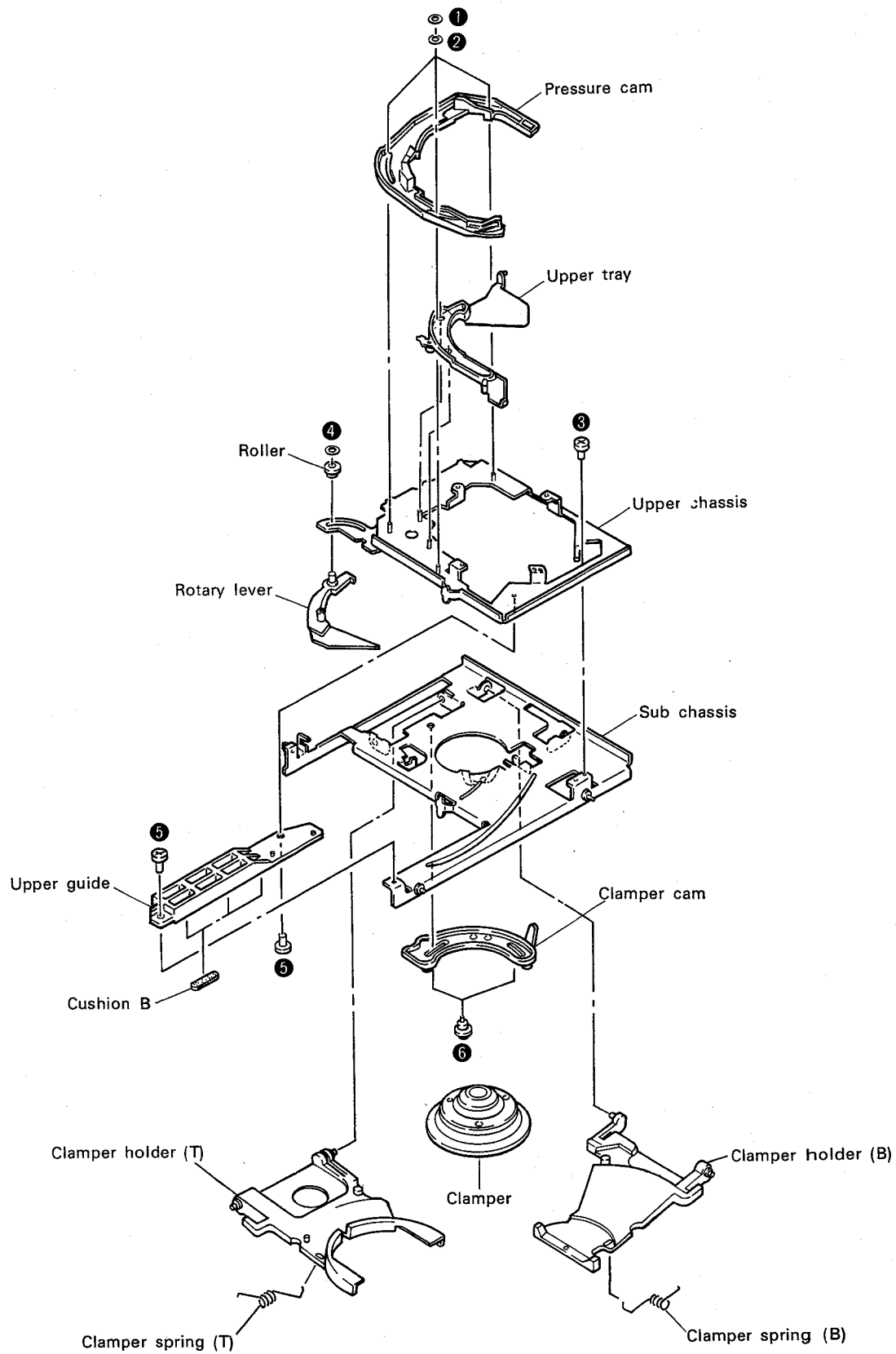


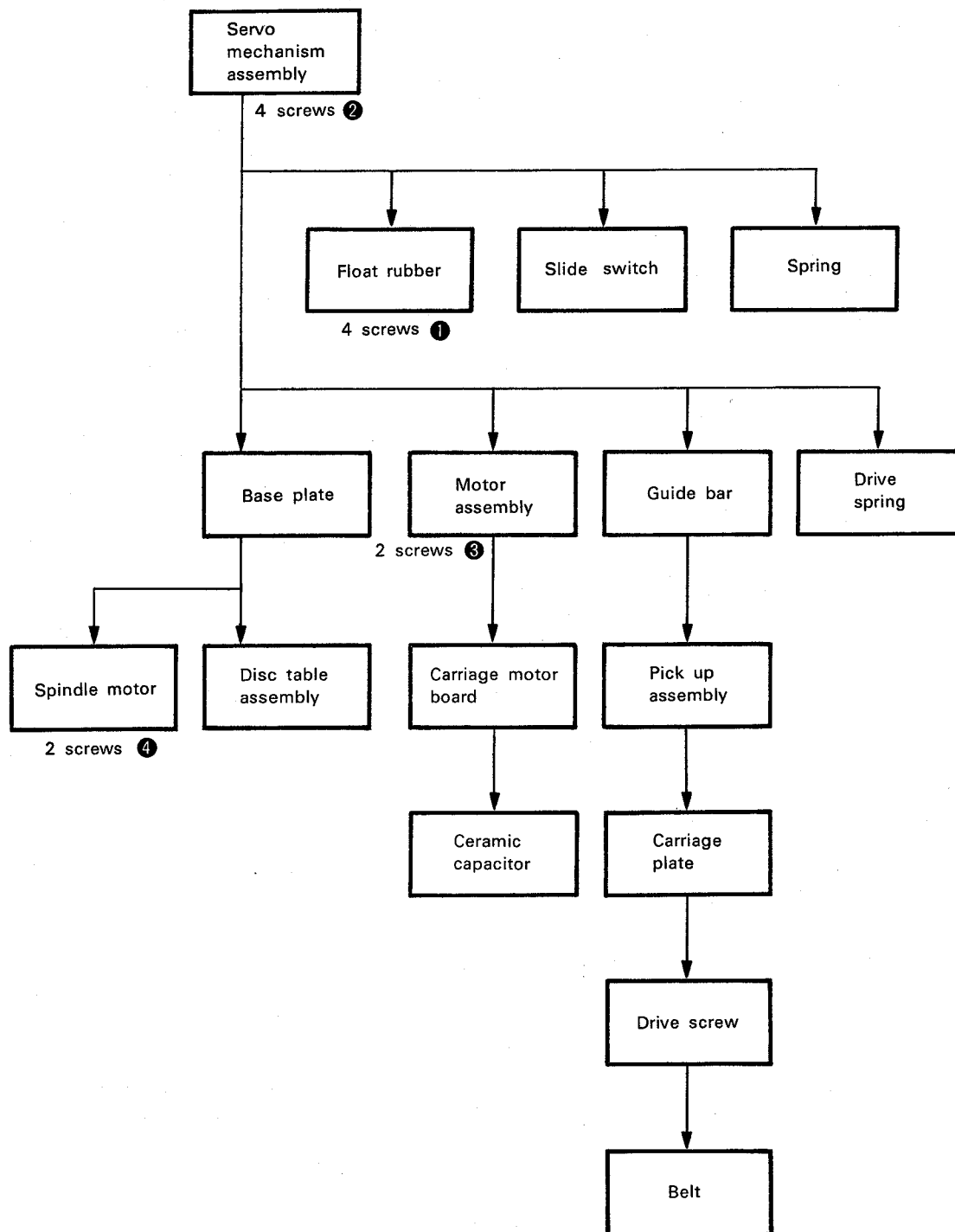


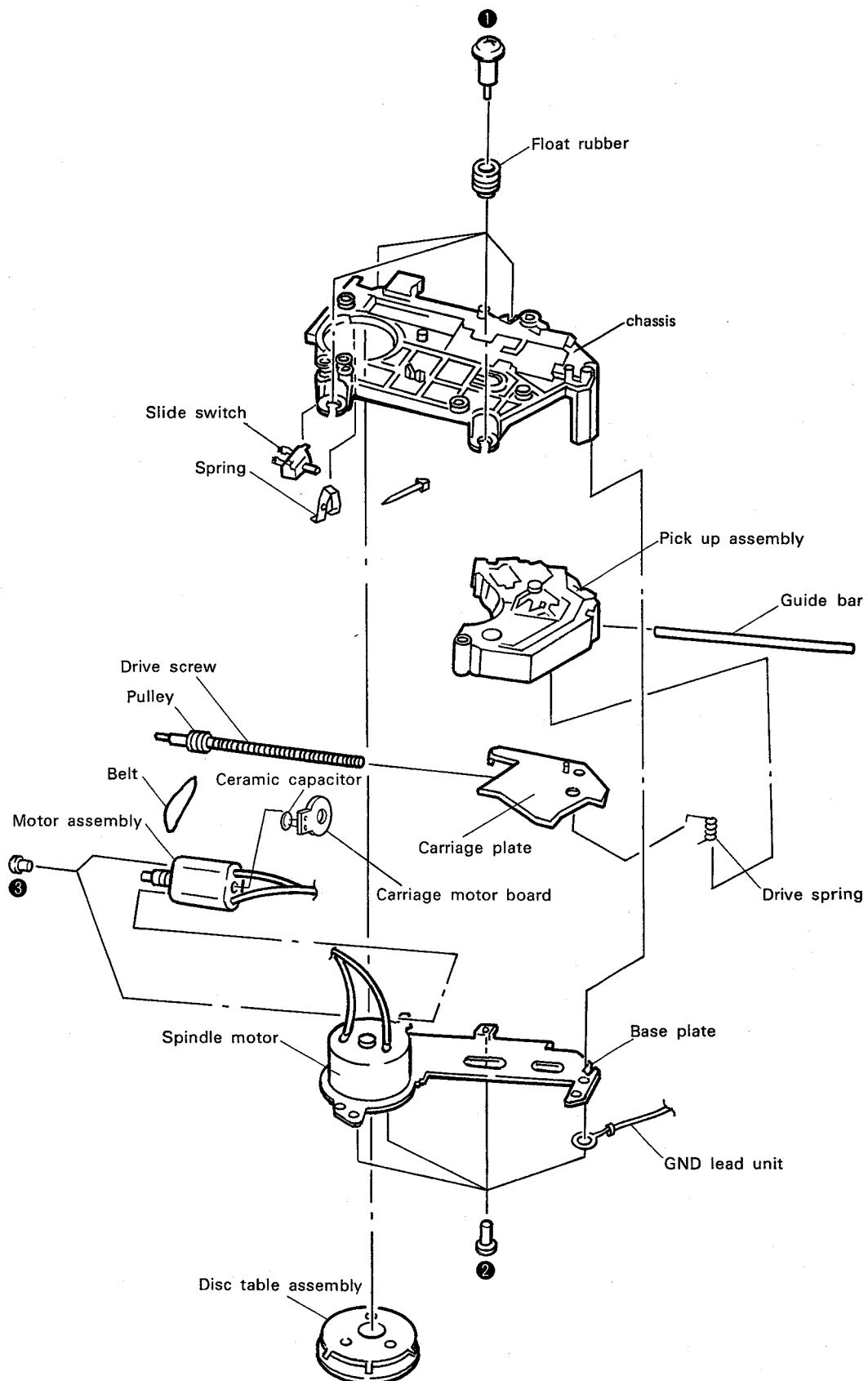










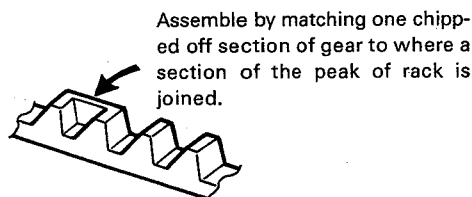


ASSEMBLY KNOW-HOW

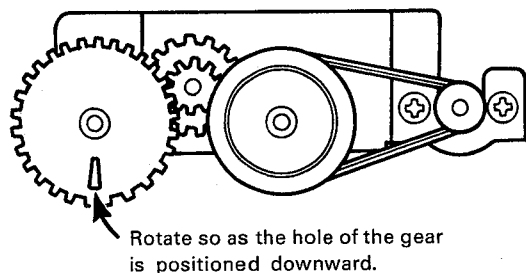
Loading Assembly

1. Gear and rack synchronization

Install by matching positions of left side gear (Last stage) and rack with unit facing you.



To be more specific, shift the rack manually to rearmost part (i.e. state of completely clamped) and assemble after rotating the gear unit as shown in Fig. below. In this way, it should be automatically synchronized. In the worst case when assembled defectively, it is easily noticed because it stops during loading.



2. The gear unit assembling screws in shown above should be always used specified one.

Always assemble the gear unit (L side) with PCZ30P040FMC. Assembly of mechanical section uses almost always BBZ30P060FMC but when this screw is used accidentally to assemble the gear unit, not only the rack malfunctions but also the teeth section of the rack may be damaging.

3. Home position marking of rack

Be sure to see to it that the removal and assembly of the mechanical unit are performed with the rack in the home position.

The home position is when the guide shaft ③ -a of the rack becomes horizontally aligned to the hole ③ -b of gear angle L.

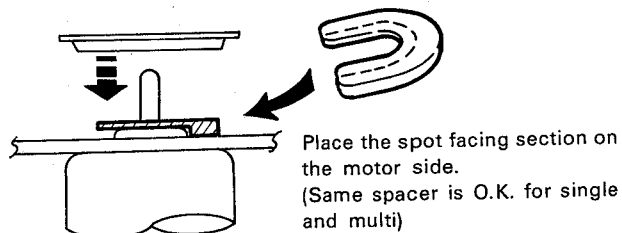
4. Vertical motion servo mechanism deck position marking

There is 1-6 carved seals on the upper section of the mechanism and if the tip of the synchronization lever is matched to this pattern carved seals, it becomes the specified position. When assembling the mechanical section, if it is matched to 3 or 4, screw securing becomes easy.

Moreover, single magazine is played at the "3" position.

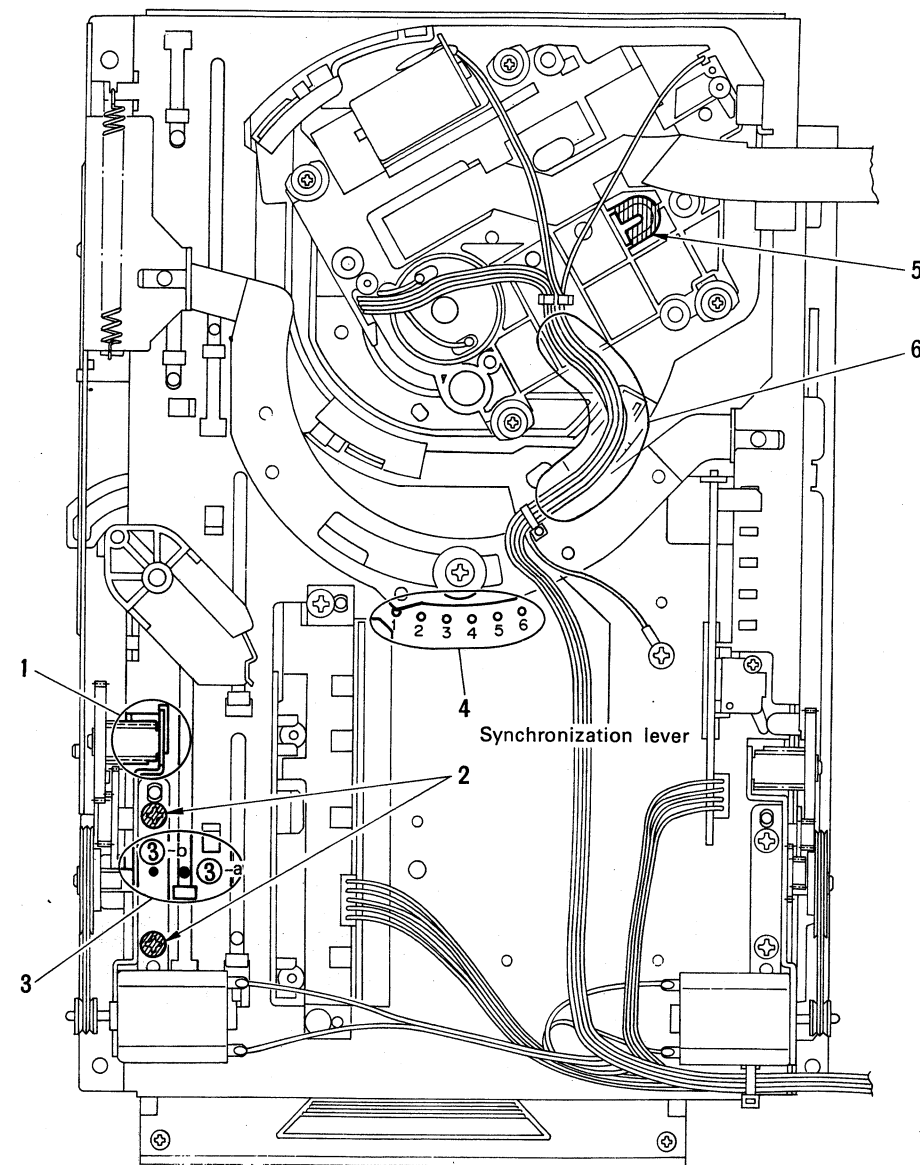
5. Disc table pressure-in spacer

On the plastic section of the servo mechanism, a disc table pressure-in spacer is formed. When replacing disc table and motor, cut off and use as a spacer.



6. Provide for a little slacking to the connector lead from the servo mechanism during styling.

As the servo mechanism's performing position goes up and down from the first sheet to the sixth sheet, provide for slacking as shown in the Fig. during binding.

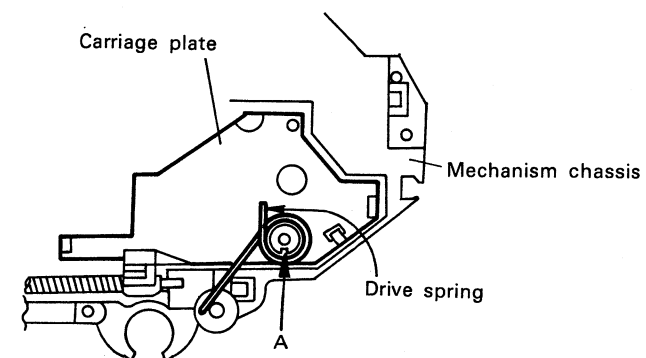


Multi-mechanism appearance diagram

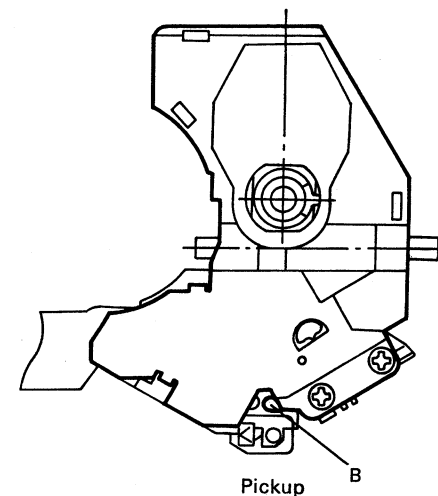
Servo Mechanism

1. How to hook of drive spring

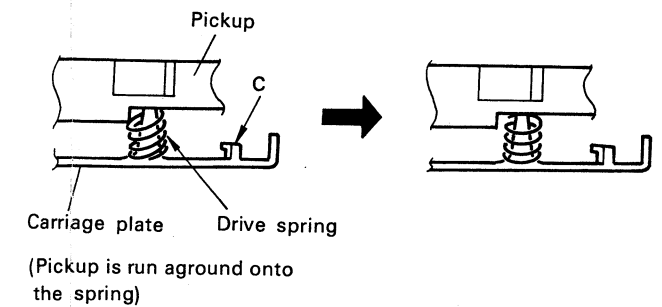
- Place the carriage plate at outermost side of circumference.
- Place the drive spring to the right rotating position as possible with the shorter arm side up to the spring hooking pin (A) of carriage plate.



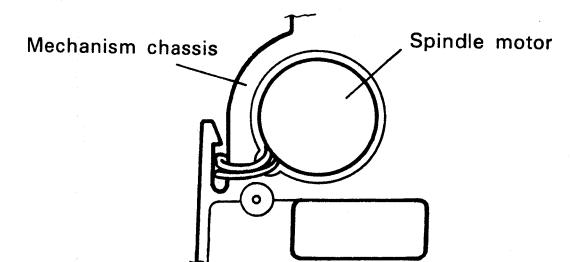
- Pass guide bar through pickup and first insert right side of guide bar to installing position of mechanism chassis. Then while supposing to insert pin (A) of carriage plate into long slot (B) of pickup, insert left side of guide bar into installing position of mechanism chassis.



- When drive spring rotates when hooking onto hook (C) of carriage plate with the longer arm of drive spring, use a pair of tweezers to rotate to the right the shorter arm of the drive spring and return it to the specified position.



2. As the carriage plate forcibly pushes the switch because there is no stopper in the inner circumference, caution should be exercised when moving the pickup in the test mode.
3. When removing the base plate (Sheet metal part) and reattaching, it is difficult to attach if the lead wire of the spindle motor is not in the notch of the mechanism chassis.



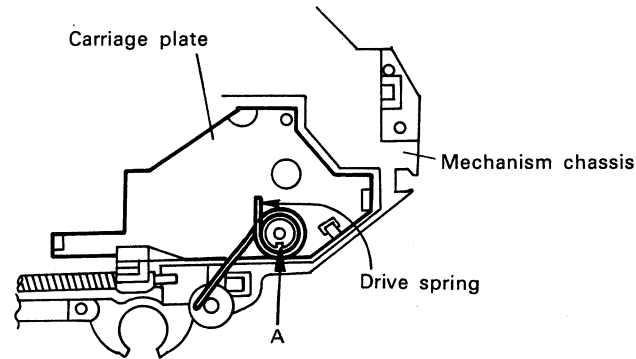
Supplement

- In order to confirm whether the drive spring is correctly hooked or not, it suffices to ascertain that the pickup is first manually drawn to the outer circumference side and returns to the inner circumference side when the hand is released in the assembled state.

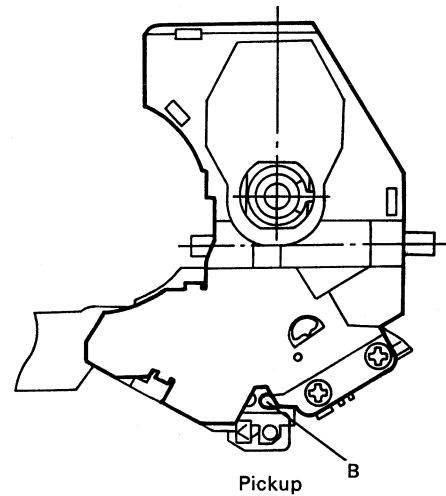
Servo Mechanism

1. How to hook of drive spring

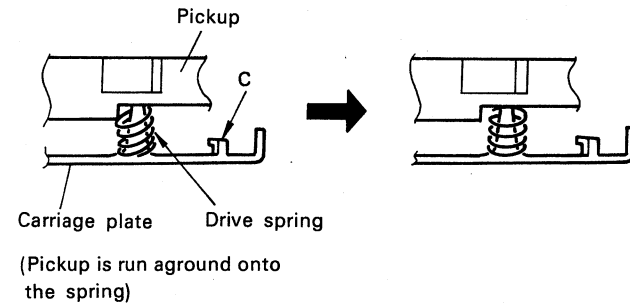
- Place the carriage plate at outermost side of circumference.
- Place the drive spring to the right rotating position as possible with the shorter arm side up to the spring hooking pin (A) of carriage plate.



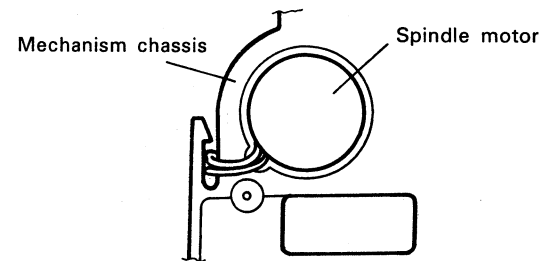
- Pass guide bar through pickup and first insert right side of guide bar to installing position of mechanism chassis. Then while supposing to insert pin (A) of carriage plate into long slot (B) of pickup, insert left side of guide bar into installing position of mechanism chassis.



- When drive spring rotates when hooking onto hook (C) of carriage plate with the longer arm of drive spring, use a pair of tweezers to rotate to the right the shorter arm of the drive spring and return it to the specified position.



2. As the carriage plate forcibly pushes the switch because there is no stopper in the inner circumference, caution should be exercised when moving the pickup in the test mode.
3. When removing the base plate (Sheet metal part) and reattaching, it is difficult to attach if the lead wire of the spindle motor is not in the notch of the mechanism chassis.



Supplement

- In order to confirm whether the drive spring is correctly hooked or not, it suffices to ascertain that the pickup is first manually drawn to the outer circumference side and returns to the inner circumference side when the hand is released in the assembled state.

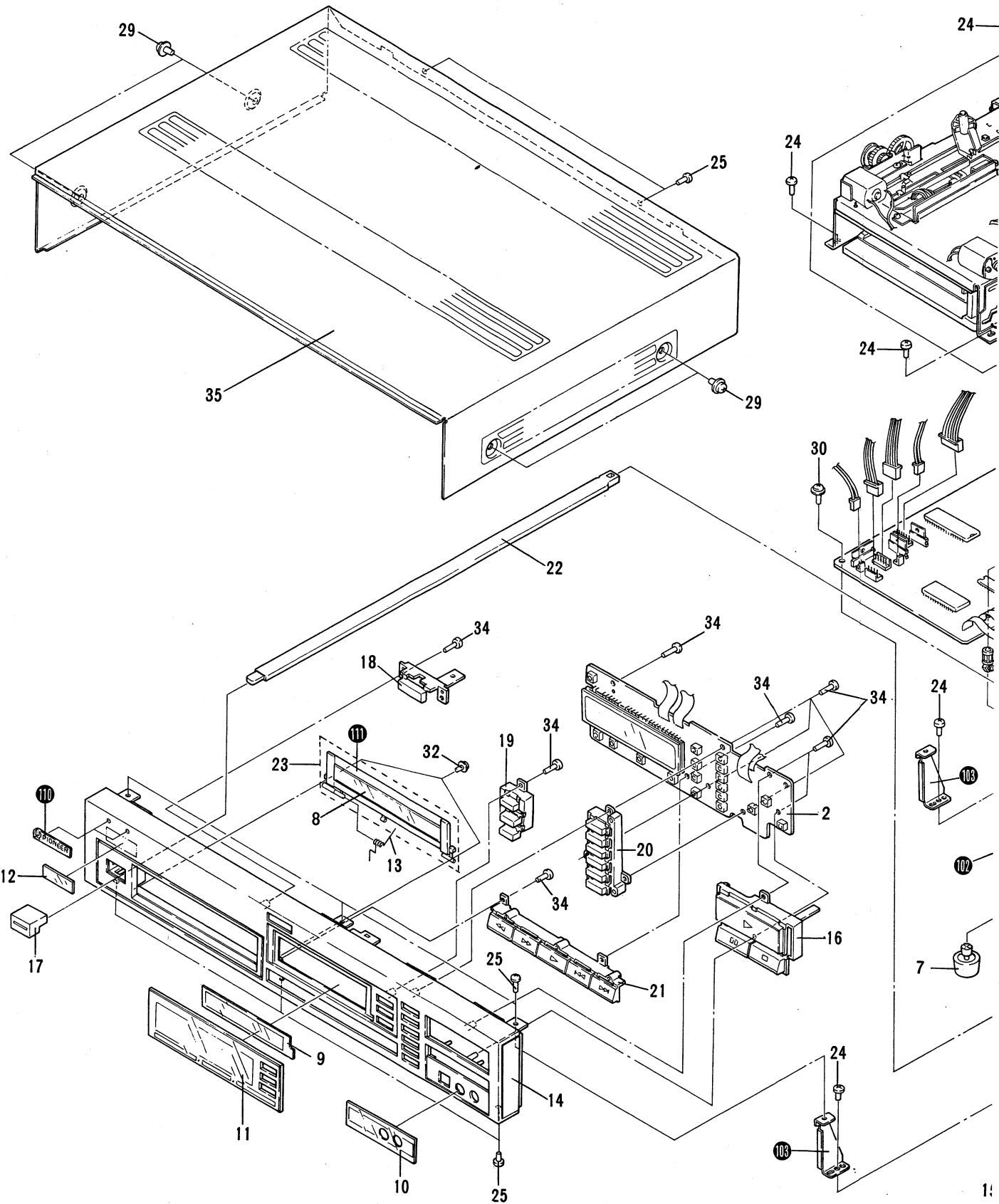
MEMO

5. EXPLODED VIEWS AND PARTS LIST

- NOTES:
- Parts without part number cannot be supplied.
 - The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
 - Parts marked by "⊙" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List of Exterior

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
Δ ⊙	1	PWZ1159	Main board assembly		27	BBZ30P080FZK	Screw
⊙	2	PWZ1160	Control board assembly		28	BBZ40P080FCC	Screw
Δ	3	CM-22C	Strain relief		29	FBT40P080FZK	Screw
Δ	4	PDG1002	AC Power cord		30	IBZ30P060FCC	Screw
Δ $\star$	5	PTT1026	Power transformer (AC120V)		31	IBZ30P150FCU	Screw
	6	PBK1001	GND plate		32	IPZ30P060FMC	Screw
	7	REC-369	Leg assembly		33	PMZ30P060FCU	Screw
	8	PAM1103	Door name plate		34	PPZ30P080FMC	Screw
	9	PAM1067	FL filter		35	PNA1107	Bonnet
	10	PAM1068	Phono name plate	Δ $\star\star$	36	PSA-009	Power switch
	11	PAN1069	Display window		101		Rear panel
	12	PAM1074	Panel name plate		102		Base
	13	PBH-456	Door spring		103		Angle
	14	PNW1147	Control panel		104		SW angle
	15	PAC-266	Headphone knob (PHONES LEVEL)		105		Angle (C)
					106		Angle (P)
	16	PAC1095	Function button		107		Cussion
	17	PAC1097	Power button		108		PCB spacer
	18	PAC1098	Eject button		109		Multi machanism assembly
	19	PAC1100	TRP button		110		Name plate
	20	PAC1101	DISC button				
	21	PAC1112	Operation button		111		Door
	22	PNY-528	Power SW joint		112		Headphone board assembly
	23	PYY1031	Door assembly		113		Power switch board assembly
	24	BBZ30P060FCC	Screw		114		Transformer board assembly
	25	BBZ30P060FZK	Screw				
	26						



1 2 3 4 5 6

A

B

C

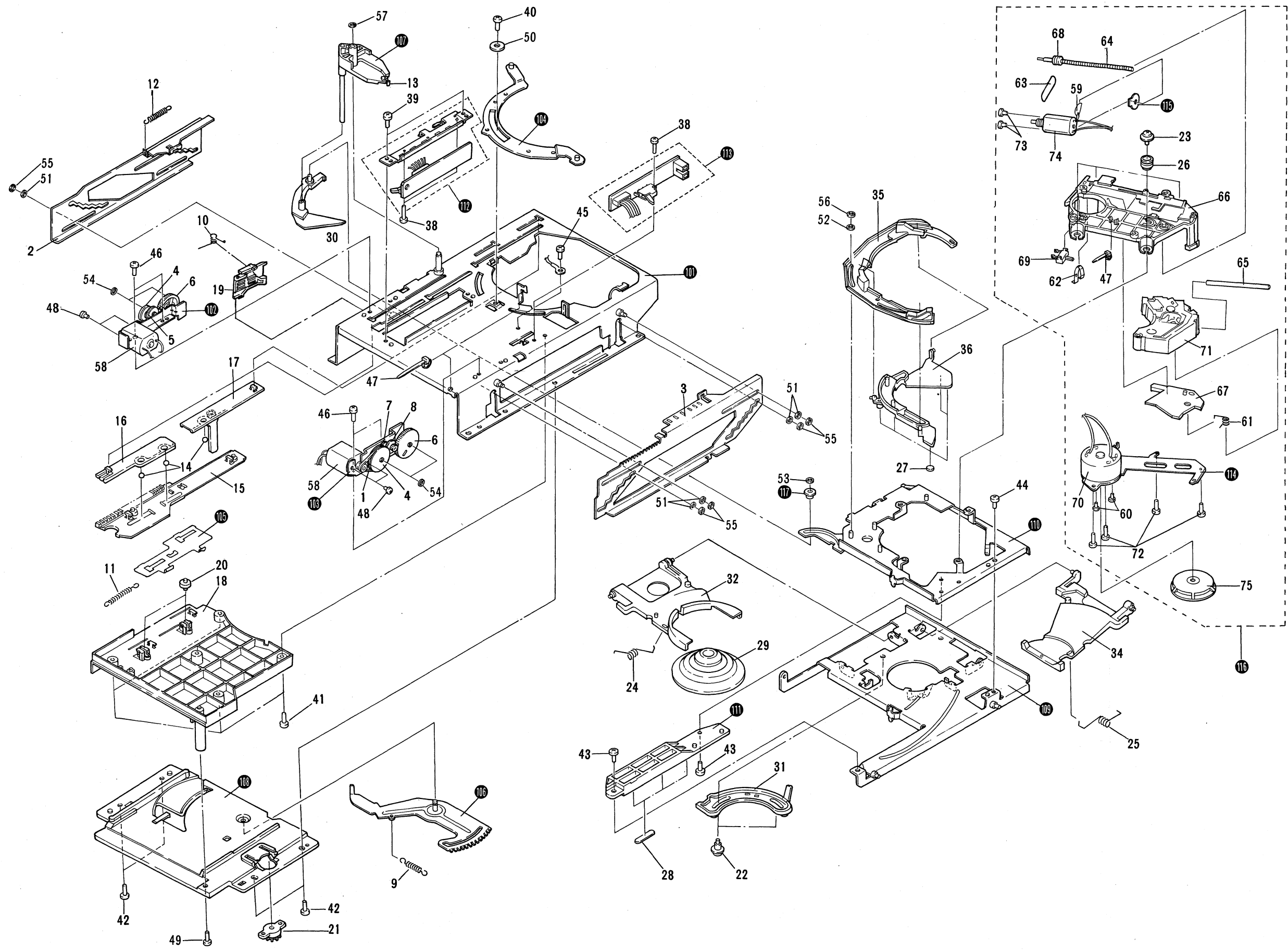
D

A

B

C

D



Parts List

Mark	No.
★★	1
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1 2 3 4 5 6

Parts List of Mechanism Section

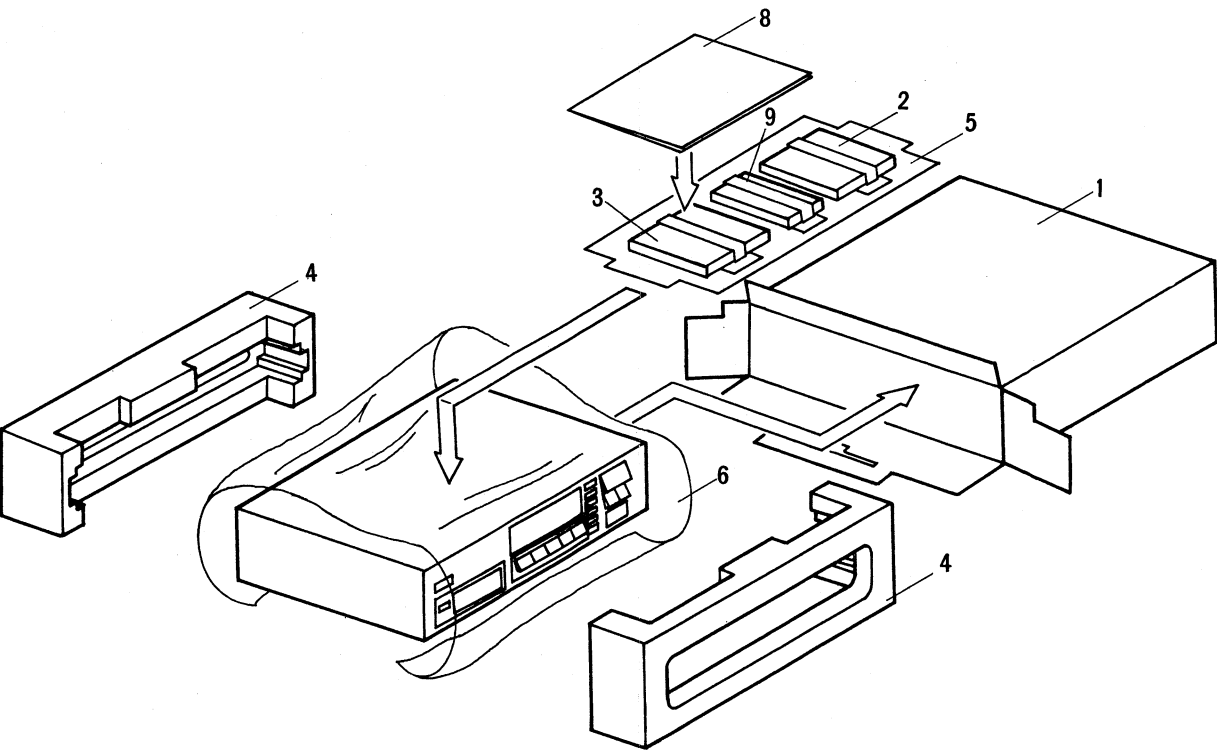
Mark	No.	Part No.	Description
A	★★	1 PEB1015	Belt
		2 PNB1028	Stair (L)
		3 PNB1029	Stair (R)
		4 PNW1095	Gear pulley
		5 PNW1096	Gear
		6 PNW1097	Gear
		7 PNW1122	Gear
		8 PNW1098	Idler gear
		9 PBH-465	Eject spring
		10 PBH1014	Lock spring
		11 PBH1015	SM spring
		12 PBH1018	Stair spring
		13 PBK1009	Drive spring
		14 PBP-001	Steel ball 4φ
		15 PNW1099	Rack
B		16 PNW1100	Drive plate
		17 PNW1101	Operation plate
		18 PNW1102	Top guide
		19 PNW1104	Lock lever
		20 PNY-386	Roller
		21 PXC-016	Damper assembly
		22 PBA-125	Screw
		23 PBA1002	Screw
		24 PBH1016	Clamper spring(T)
		25 PBH1017	Clamper spring(B)
C		26 PEB1014	Float rubber
		27 PED1001	Cushion (A)
		28 PED1002	Cushion (B)
		29 PNW1068	Clamper
		30 PNW1105	Rotary lever
		31 PNW1106	Clamper cam
		32 PNW1107	Clamper holder (T)
		33	.....
		34 PNW1108	Clamper holder (B)
		35 PNW1110	Pressure cam
D		36 PNW1111	Upper tray
		37	.....
		38 BBZ20P080FMC	Screw
		39 BBZ30P060FMC	Screw
		40 BBZ30P060FMC	Screw
		41 BBZ30P060FMC	Screw
		42 BBZ30P060FMC	Screw
		43 BBZ30P060FMC	Screw
		44 BBZ30P060FMC	Screw
		45 BBZ30P060FMC	Screw
		46 PCZ30P040FMC	Screw
		47 PEC-107	Binder
		48 PMZ20P030FMC	Screw
		49 PPZ30P080FMC	Screw
		50 WA30F120M100	Washer

Mark	No.	Part No.	Description
		51 WA31D054D050	Washer
		52 WA31D054D050	Washer
		53 WT12D032D025	Washer
		54 WT25D047D025	Washer
		55 WT25D047D025	Washer
		56 WT25D047D025	Washer
		57 WT31D054D025	Washer
★★	58	PYY1025	Motor assembly (LOADING, DISC SELECT)
		59 CGDYX104M25	Ceramic capacitor
		60 PBA-209	Screw
		61 PBH1008	Drive spring
		62 PBK1010	Spring
★★	63	PEB1012	Belt
		64 PLA1003	Drive screw
		65 PLA1004	Guide bar
		66 PNW1062	Chassis
		67 PNW1063	Carriage plate
		68 PNW1066	Pully
★★	69	PSH1003	Slide switch (INSIDE)
★★	70	PXM1001	Spindle motor
		71 PWY1003	Pick up assembly
		72 BPZ20P080FZK	Screw
		73 PMZ20P030FMC	Screw
★★	74	PYY1025	Motor assembly (CARRIAGE)
	75	PYY1027	Disc table assembly
	101		Main chassis
	102		Gear angle (L)
	103		Gear angle (R)
	104		Lever
	105		SM select
	106		Eject lever
	107		Drive lever
	108		Bottom guide
	109		Sub chassis
	110		Upper chassis
	111		Upper guide
	112		Switch board assembly
	113		Select board assembly
	114		Base plate
	115		Carriage motor board
	116		Servo mechanism assembly
	117		Roller

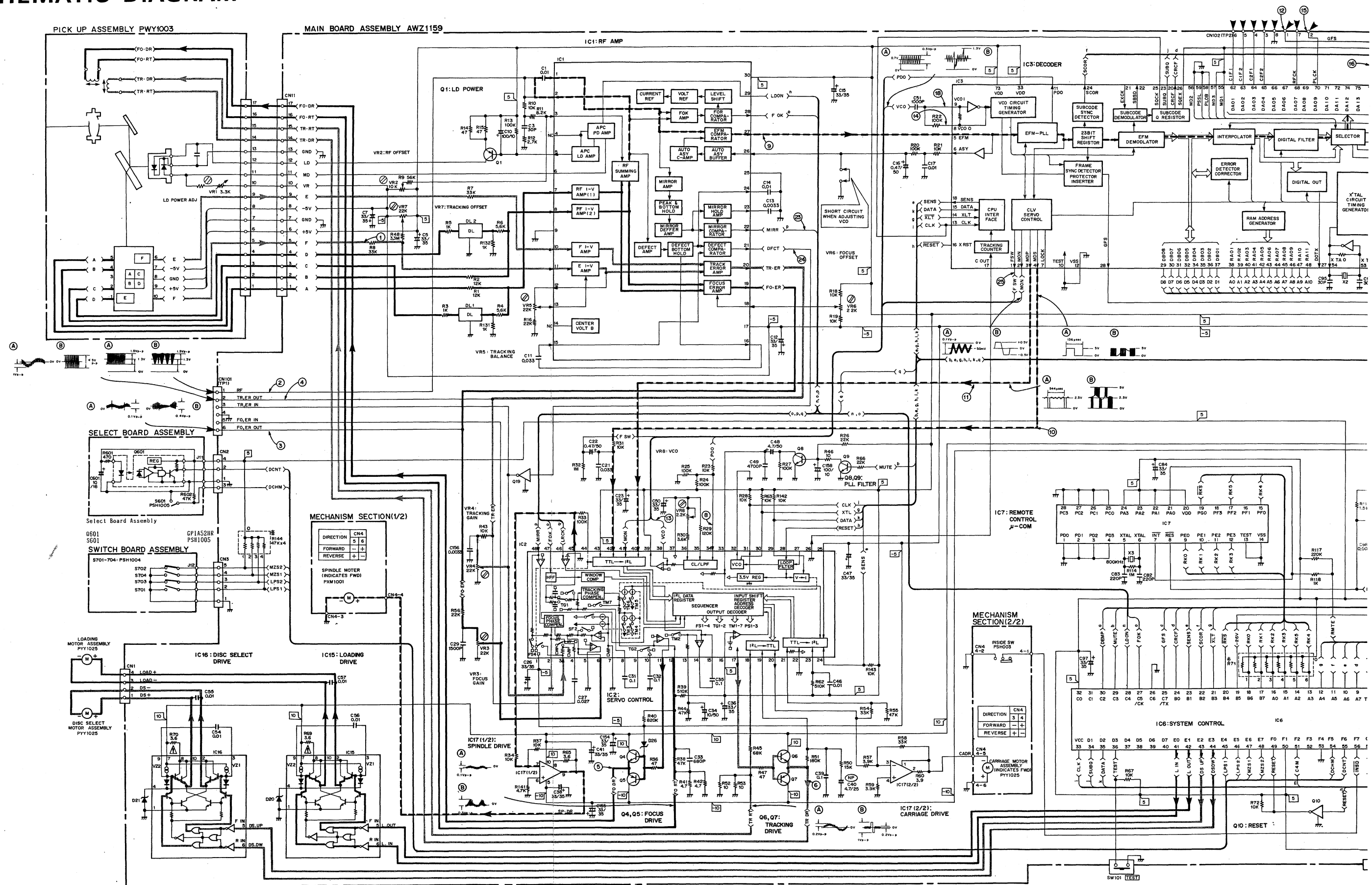
6. PACKING

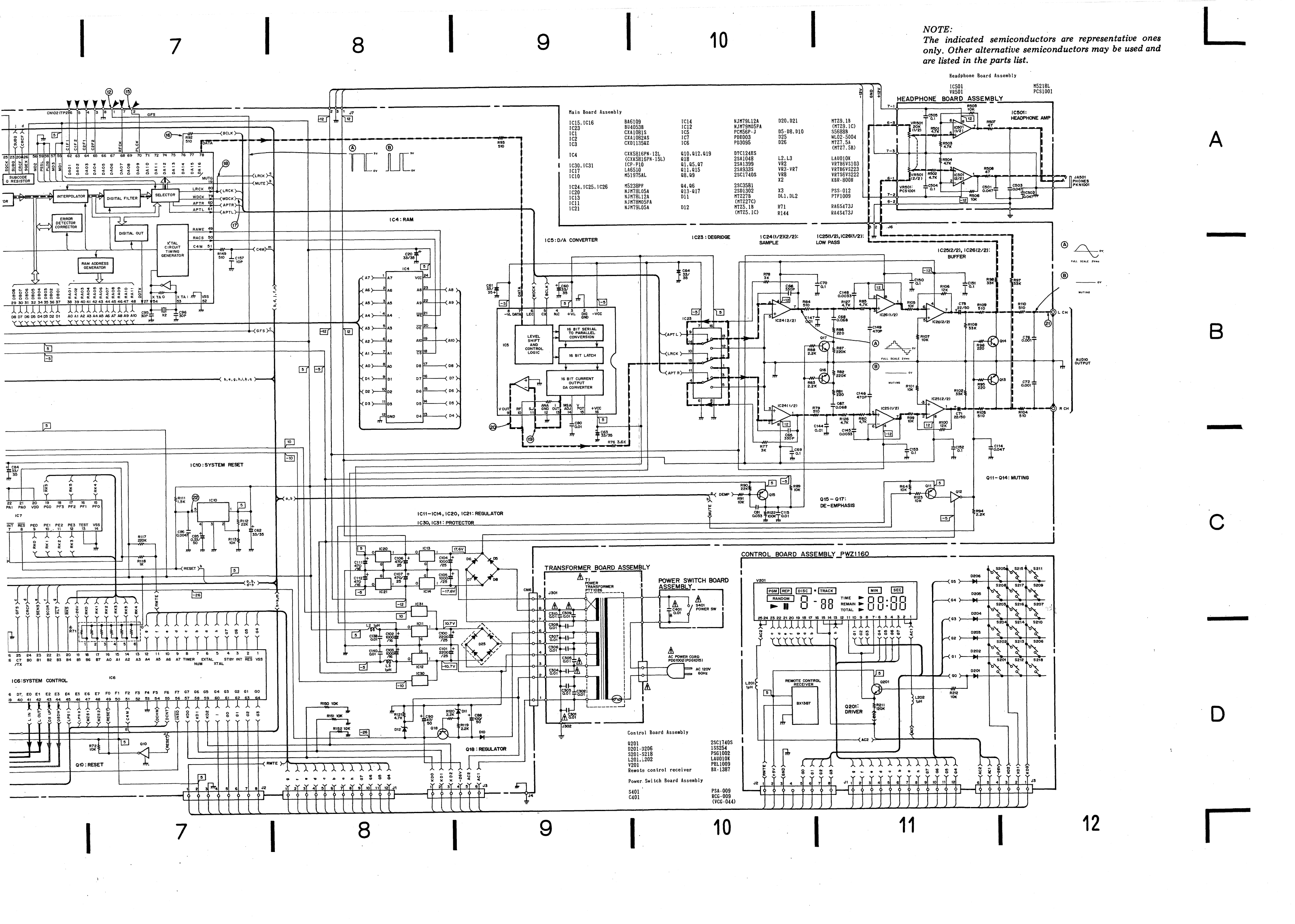
Parts List of Packing

Mark	No.	Part No.	Description
	1	PHG1080	CD Packing case
	2	PXA1050	Magazine assembly
	3	PXA1043	Single magazine assmebly
	4	PHA1021	Protector
	5	PHC1005	Accessory holder
	6	Z23-007	Mat sheet
	7	PDE1001	Connection cord with pin plug
	8	PRB1022	Operating instructions
	9	PWW1008	Remote control unit
	51		Battery (UM-4)



7. SCHEMATIC DIAGRAM

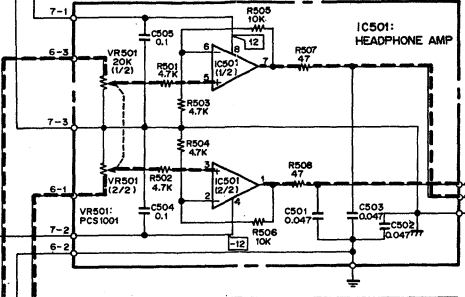




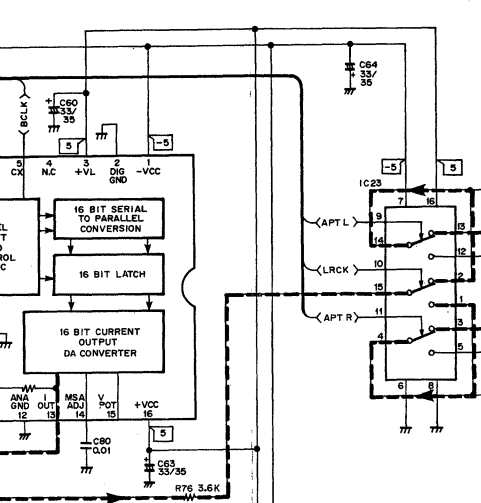
NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

Main Board Assembly		IC14		D20, D21		MT23.1B	
IC15, IC16	BAG109	IC12	NJMT9L12A	D5-D8, D10	SS688B	WL02-5004	MT27.5A
IC23	BU4053B	IC5	PCMS5P-J	D25	LAU010K	VR786VS103	VR786VS223
IC1	CXA1081S	IC7	PD0003	D26	VR786VS222	KBR-800H	PSS-012
IC2	CXA1082AS	IC6	PD3095				PTF1009
IC3	CXD1135QZ						RA6S473J
							RA4S473J
IC4	CXK5816PN-12L	Q10, Q12, Q19	DT124ES				
IC30, IC31	(CXK5816PN-15L)	Q18	2SA1048				
IC17	ICP-F10	Q1, Q5, Q7	2SA1399				
IC10	LA6510	Q11, Q15	2SA933S				
	H51975AL	Q8, Q9	2SC1740S				
IC24, IC25, IC26	M5238PF	Q4, Q6	2SC3581				
	NJMT8L05A	Q13-Q17	2SD1302				
IC13	NJMT8L12A	D11	MT227B				
IC11	NJMT8H05FA	D12	(MT227C)				
IC21	NJMT9L05A		MT25.1B				
			(MT25.1C)				

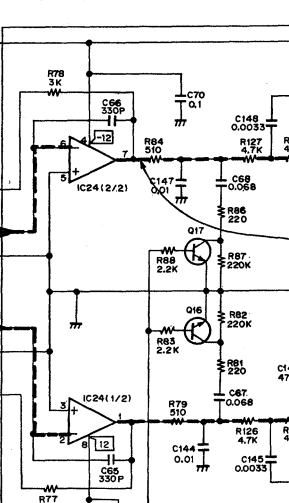
Headphone Board Assembly



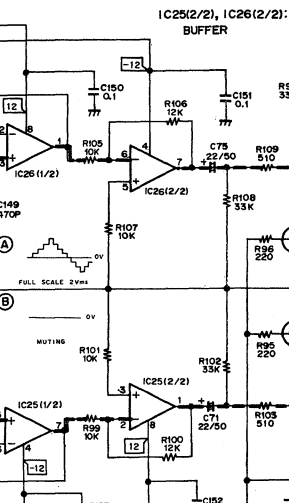
IC5: D/A CONVERTER



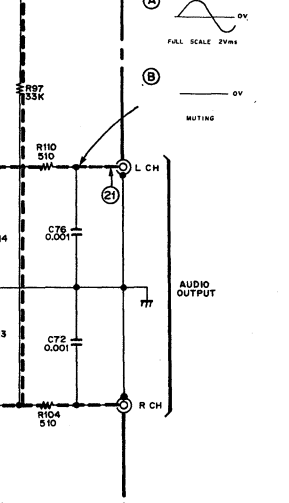
IC23: DEGRIDGE



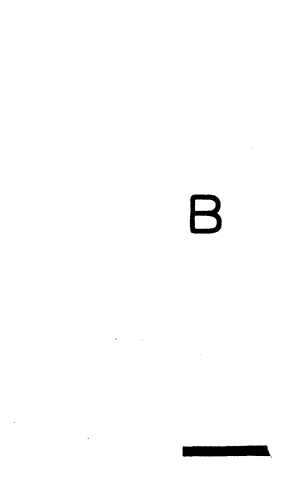
IC24(1/2), IC26(1/2): SAMPLE



IC25(1/2), IC26(1/2): LOW PASS

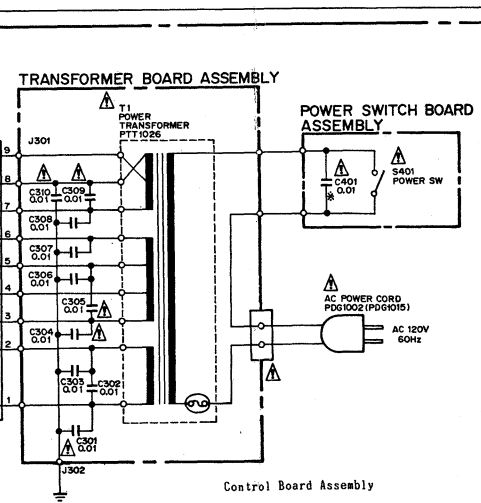


IC25(2/2), IC26(2/2): BUFFER

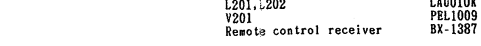


IC11-IC14, IC20, IC21: REGULATOR

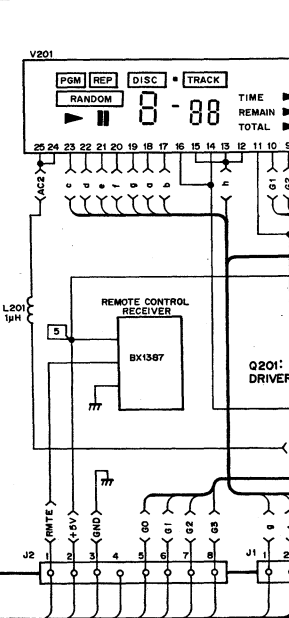
IC30, IC31: PROTECTOR



Q18: REGULATOR



CONTROL BOARD ASSEMBLY PWZ1160



- Control Board Assembly
- D201-D206
 - D201-D206
 - S201-S218
 - L201, L202
 - V201
 - Remote control receiver
 - Power Switch Board Assembly
 - S401
 - C401
- 2SC1740S
- ISS254
 - PS61002
 - LAU010K
 - PEL1009
 - BX-1387
- PSA-009
- RCG-009
 - (VCG-044)

8. P.C. BOARDS CONNECTION DIAGRAM

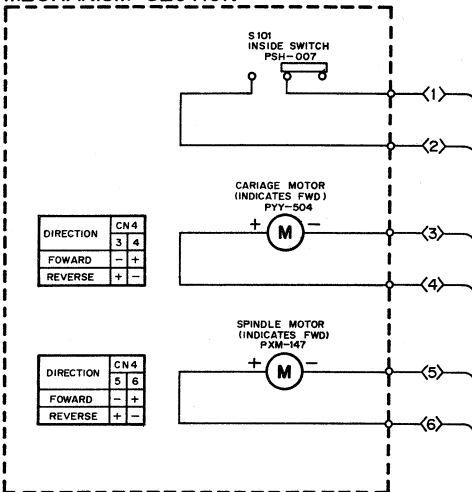
A

B

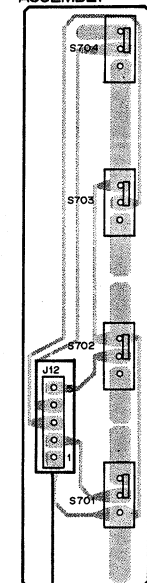
C

D

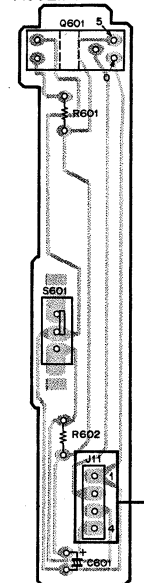
MECHANISM SECTION



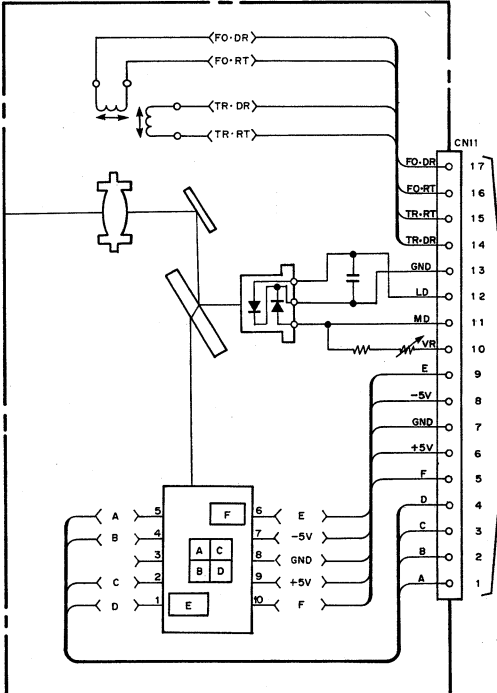
SWITCH BOARD ASSEMBLY



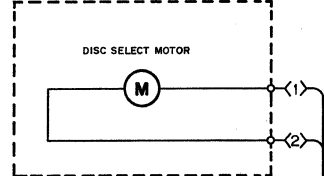
SELECT BOARD ASSEMBLY



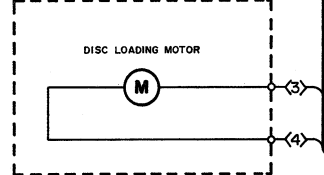
PICK UP ASSEMBLY PWY1003



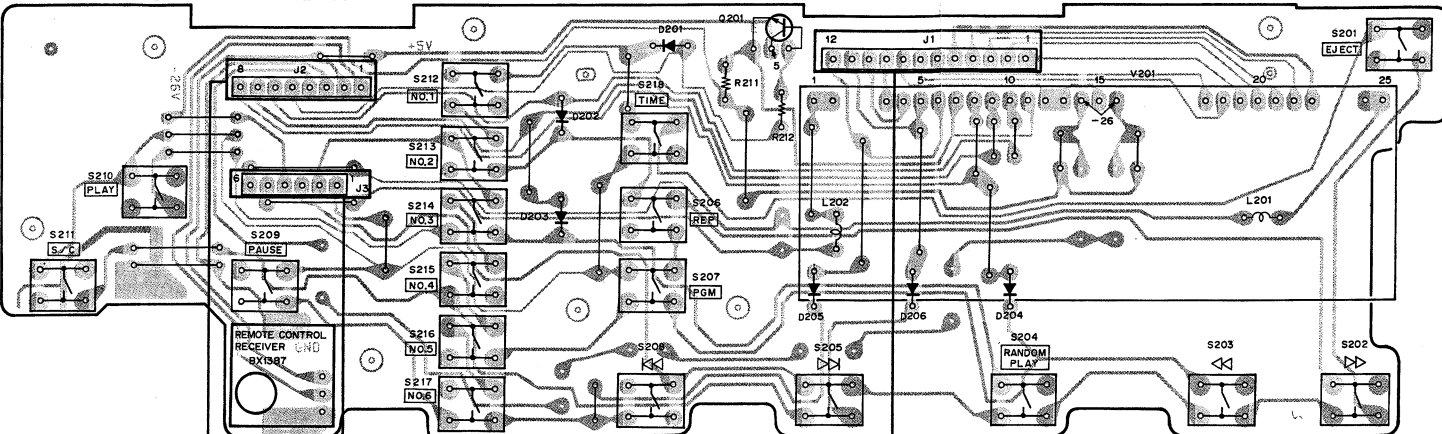
MOTOR ASSEMBLY PY1025



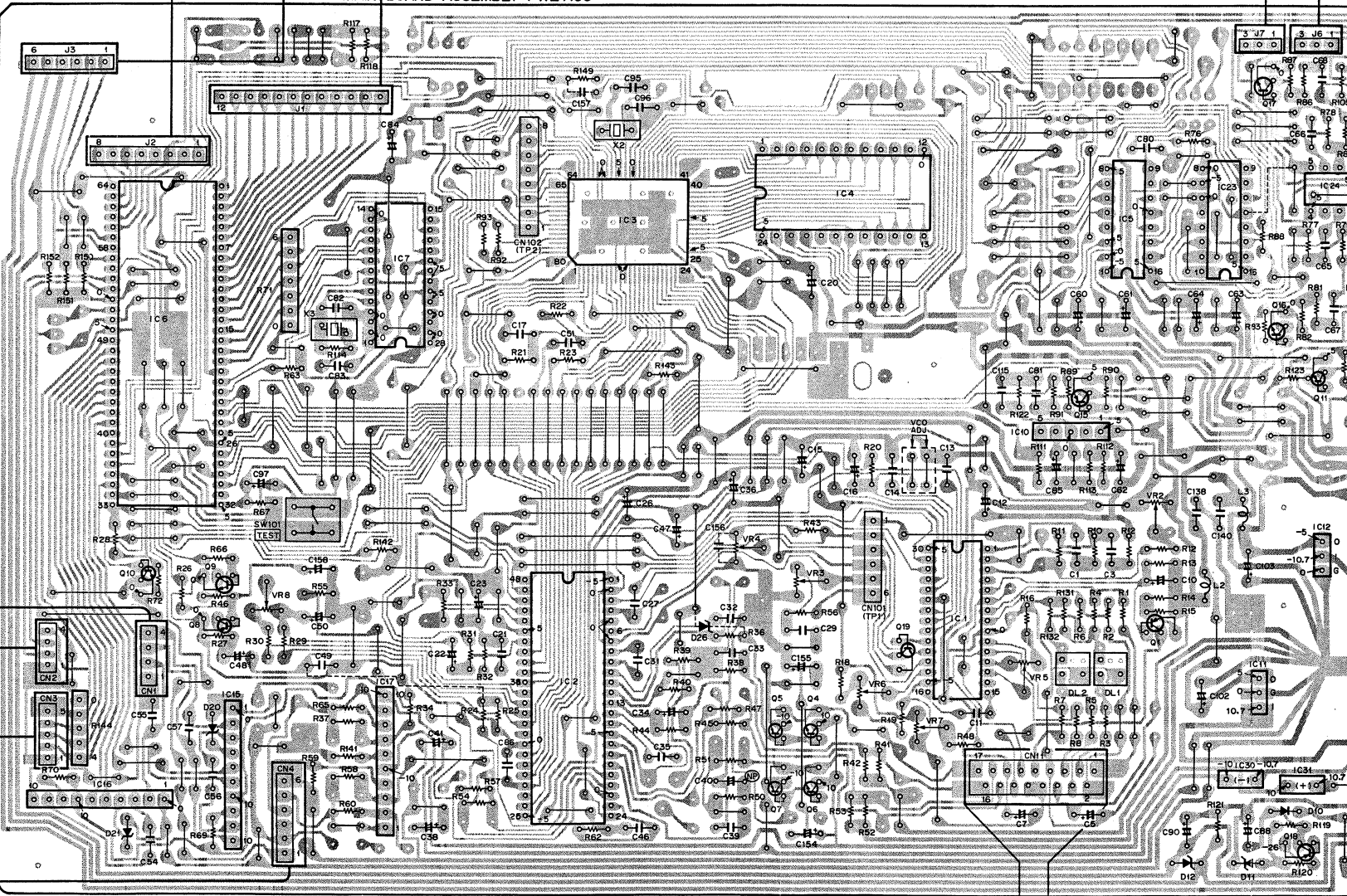
MOTOR ASSEMBLY PY1025

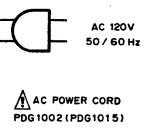


CONTROL BOARD ASSEMBLY PWZ1160



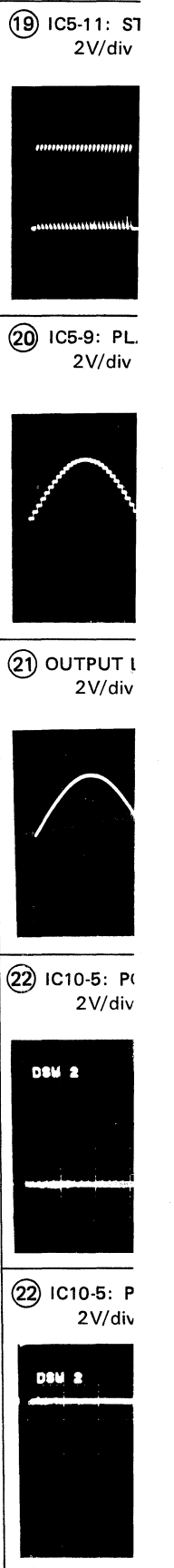
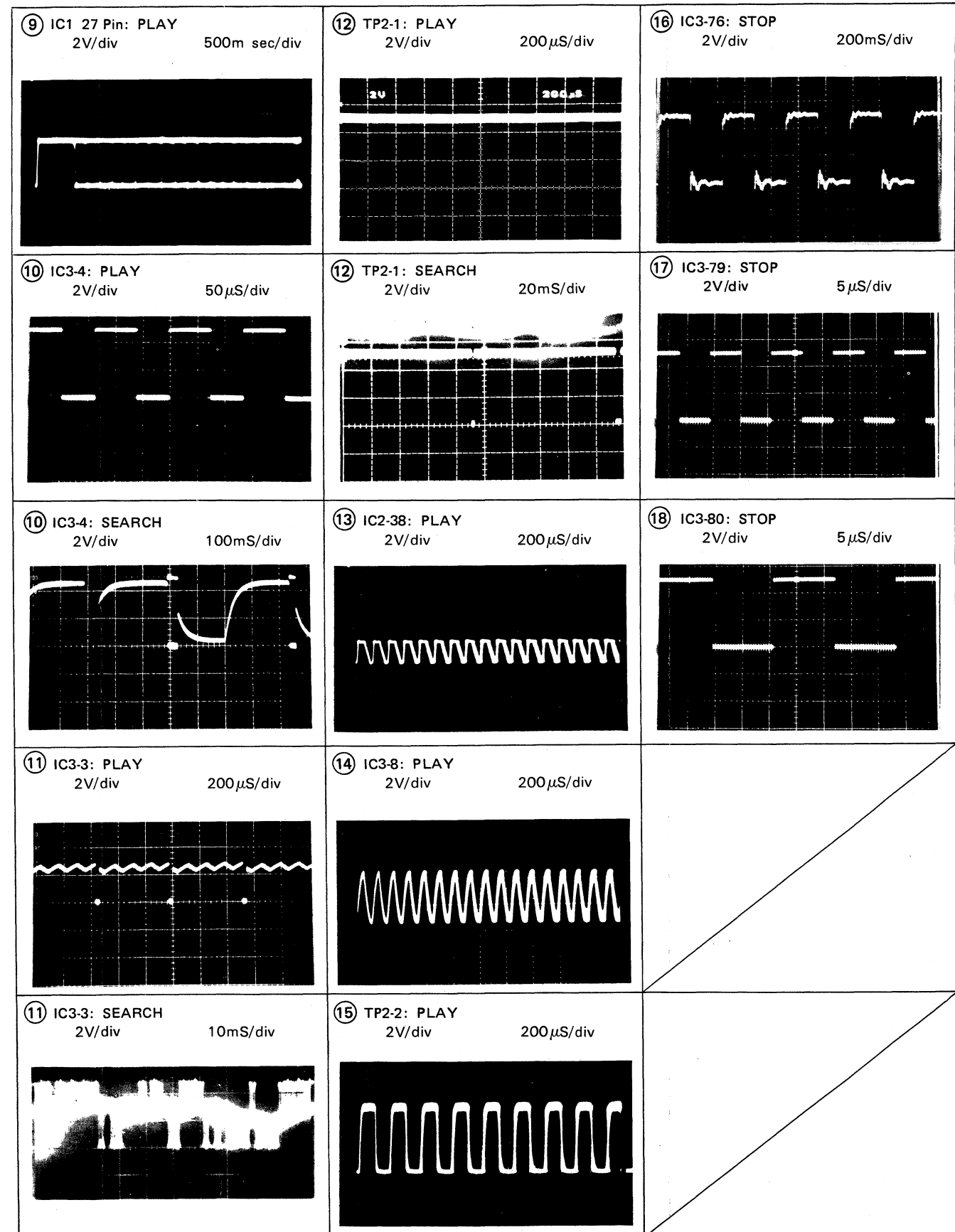
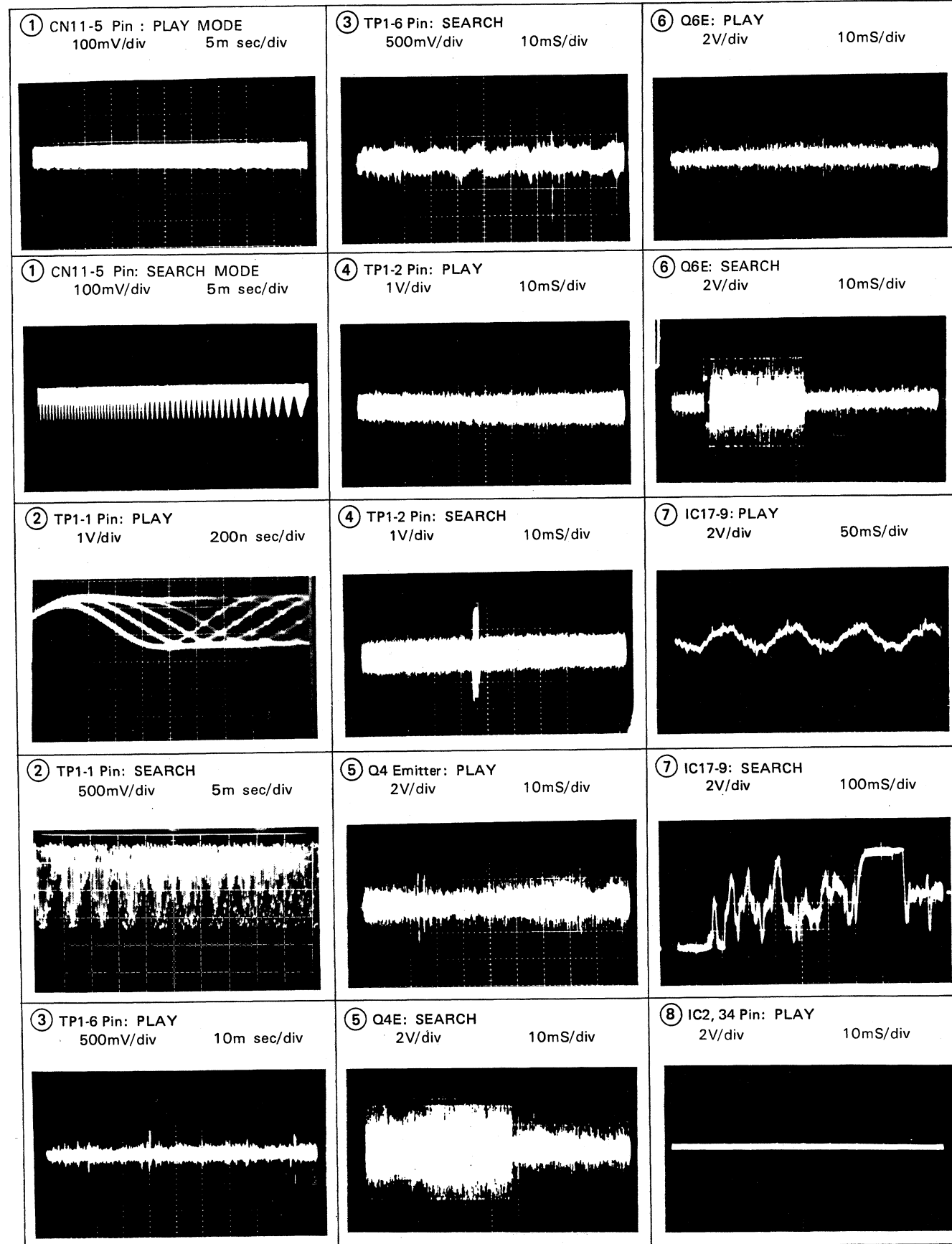
MAIN BOARD ASSEMBLY PWZ1159

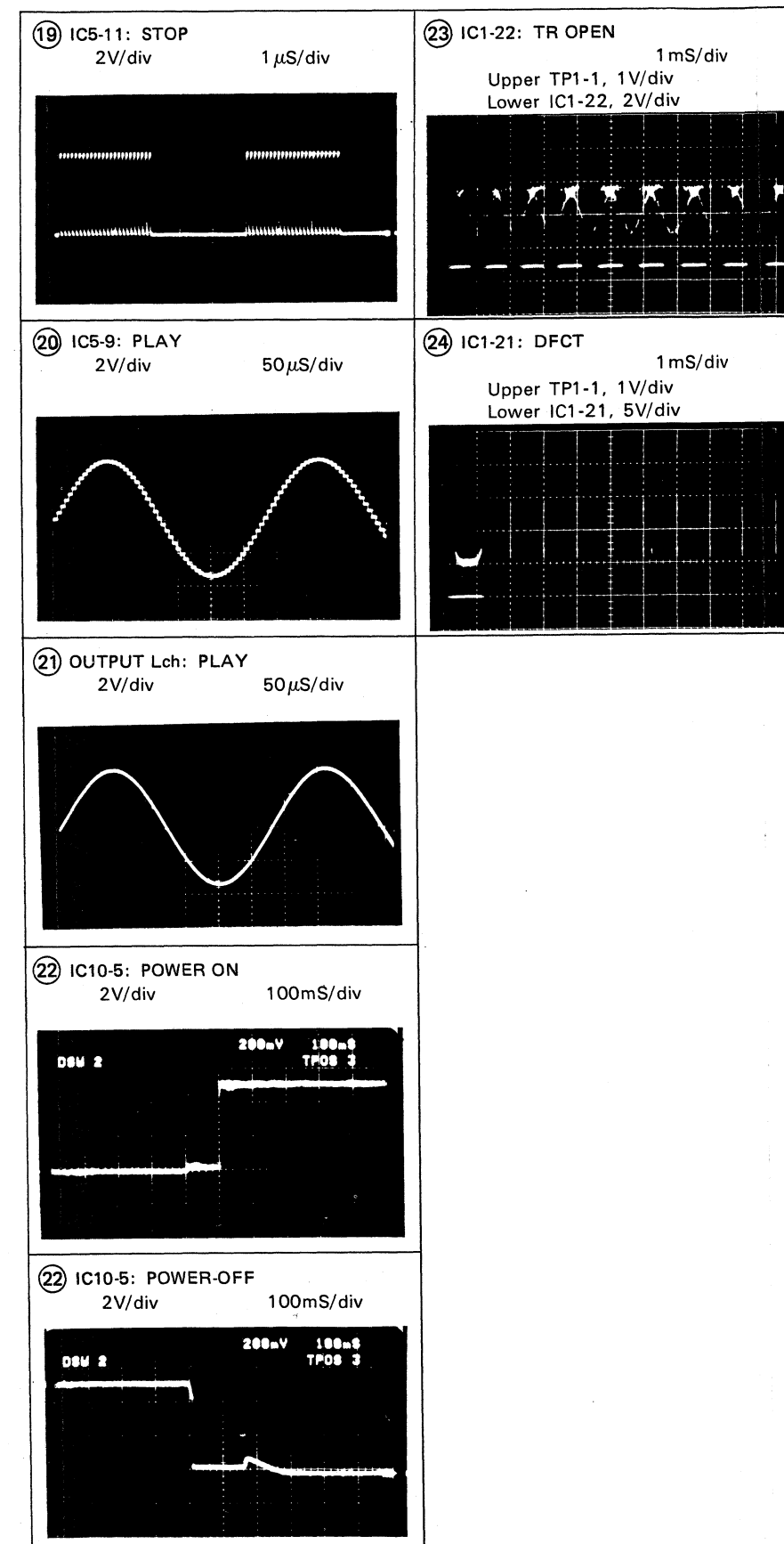
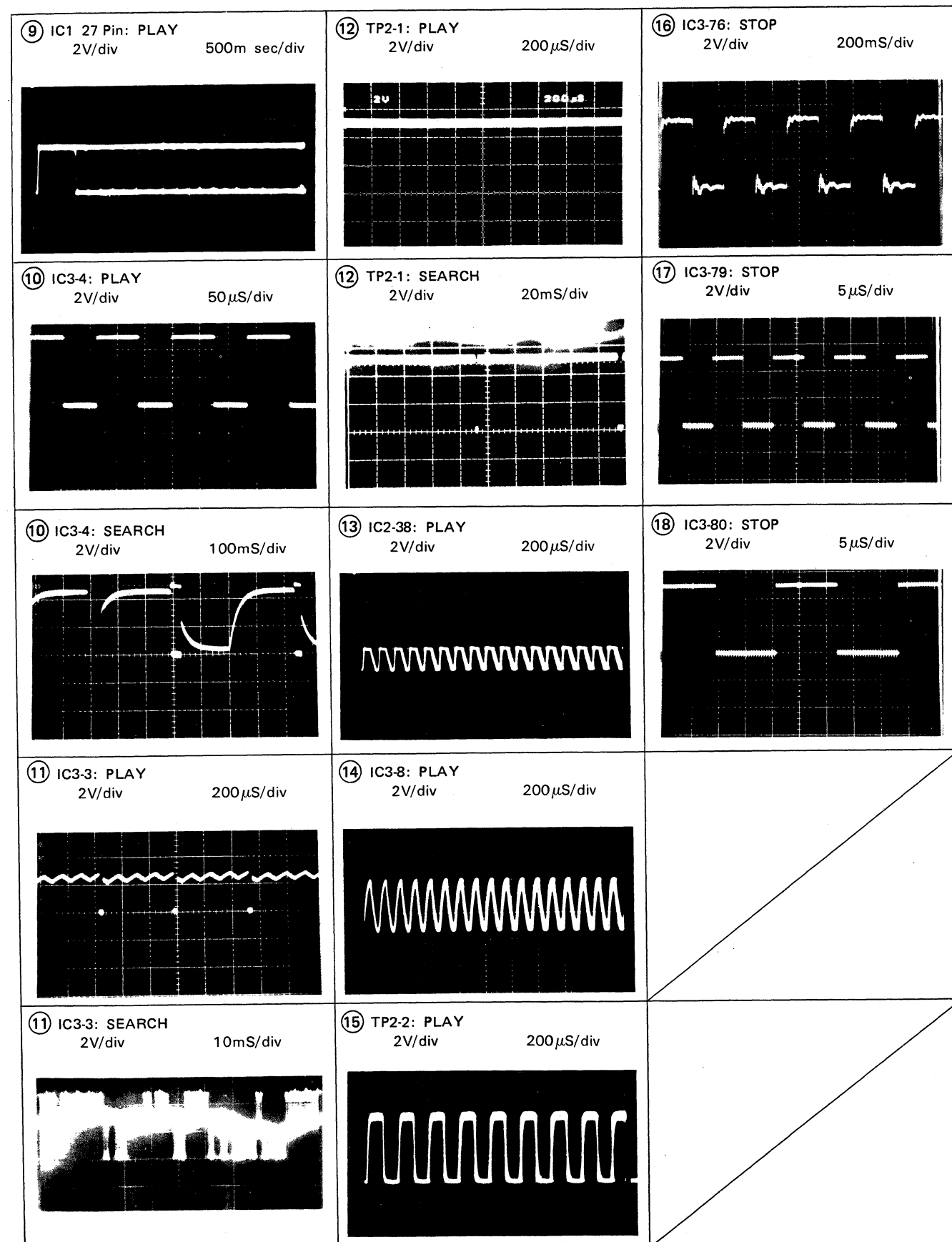




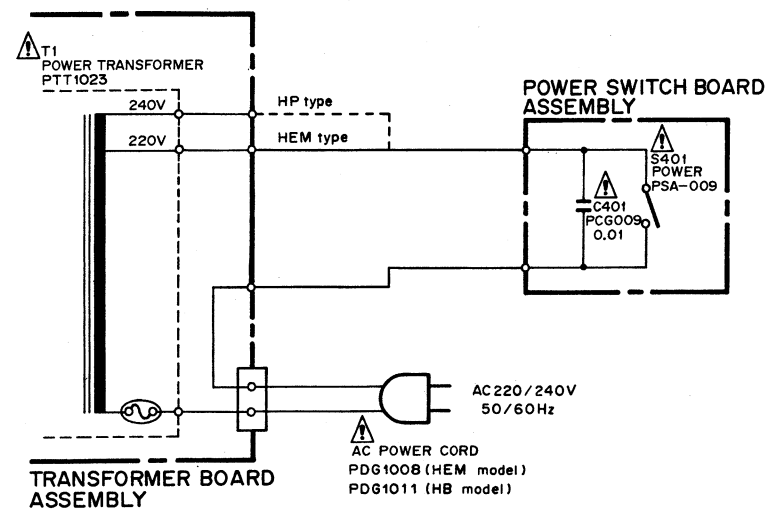
WAVEFORMS

NOTE: The encircled numbers denote measuring points in the circuit and pattern diagrams.





Schematic Diagram of HEM and HP types



Line Voltage Selection
(For HEM and HP types)

- Line voltage can be changed with following steps.
1. Disconnect the AC Power cord.
 2. Remove the Bonnet case.
 3. Change the connection of the primary lead wires.
(Connect as shown in Fig.)
 4. Stick the line voltage label on the rear panel.

Description	Part No.
220V label	AAX-193
240V label	AAX-192

Exploded View and Parts List of PD-M40/KU type

- NOTES:
- Parts without part number cannot be supplied.
 - The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your parts Stock Control, the fast moving items are indicated with the marks $\star\star$ and $\star$.
 $\star\star$ GENERALLY MOVES FASTER THAN $\star$
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
 - Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts of Exterior

Mark	No.	Part No.	Description	Mark	No.	Part No.	Description
Δ ●	1	PWZ1073	Main board assembly		26	BBZ30P060FZK	Screw
●	2	PWZ1074	Control board assembly		27	BBZ30P080FZK	Screw
Δ	3	CM-22C	Strain relief		28	BBZ40P080FMC	Screw
Δ	4	PDG1002	AC Power cord		29	FBT40P080FZK	Screw
Δ ★	5	PTT1022	Power transformer (AC120V)		30	IBZ30P060FCC	Screw
	6	PBK1001	GND plate		31	IBZ30P150FCU	Screw
	7	REC-369	Leg assembly		32	IPZ30P060FMC	Screw
	8	.....	.....		33	PMZ30P060FMC	Screw
	9	PAM1066	FL filter (KU,KC,HP and SD types)		34	PPZ30P080FMC	Screw
		PAM1067	FL filter (HEM type)		35	PPZ30P080FMC	Screw
	10	PAM1064	Phono name plate		101		Rear panel
					102		Base
	11	PAM1062	Display window		103		Angle
	12	PAM1065	Panel name plate		104		SW angle
	13	PBH-456	Door spring		105		Angle (C)
	14	PNW1146	Control panel		106		Door name plate
	15	PNA1107	Bonnet		107		Cussion
					108		PCB spacer
	16	PAC1053	Function button		109		Multi machanism assembly
	17	PAC1097	Power button		110		Name plate
	18	PAC1098	Eject button				
	19	PAC1100	TRP button		111		Door
	20	PAC1101	DISC button		112		Transformer board assembly
	21	PAC1099	Operation button				
	22	PNY-528	Power SW joint				
	23	PYY1030	Door assembly				
	24	BBZ30P060FMC	Screw				
	25	BBZ30P060FZK	Screw				

importance of the safety
parts of identical designa-
ated with the marks ★ ★
use it depends on model
every time may be longer

Description

N
N
N
N
N-

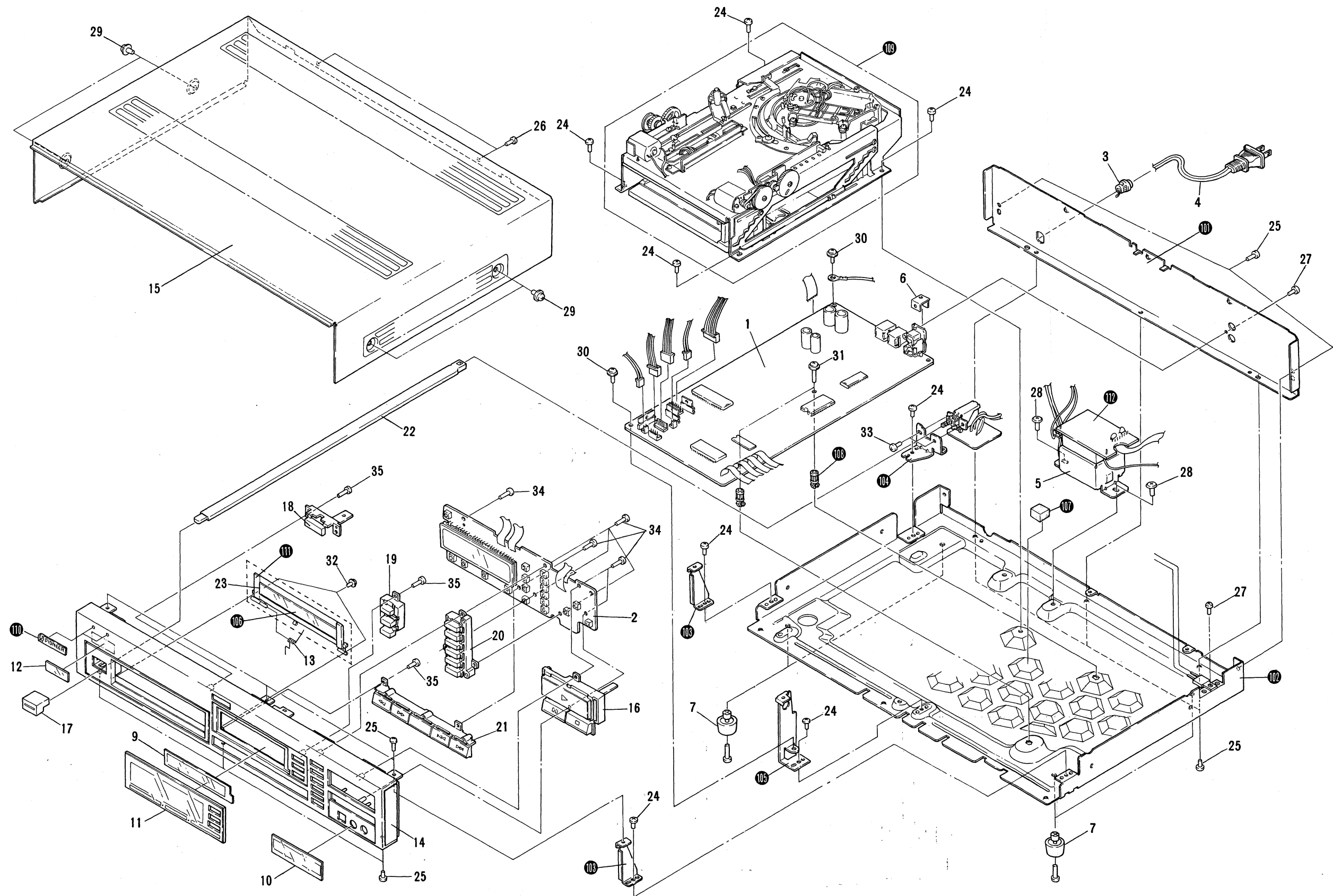
V
V
V
V
V

panel

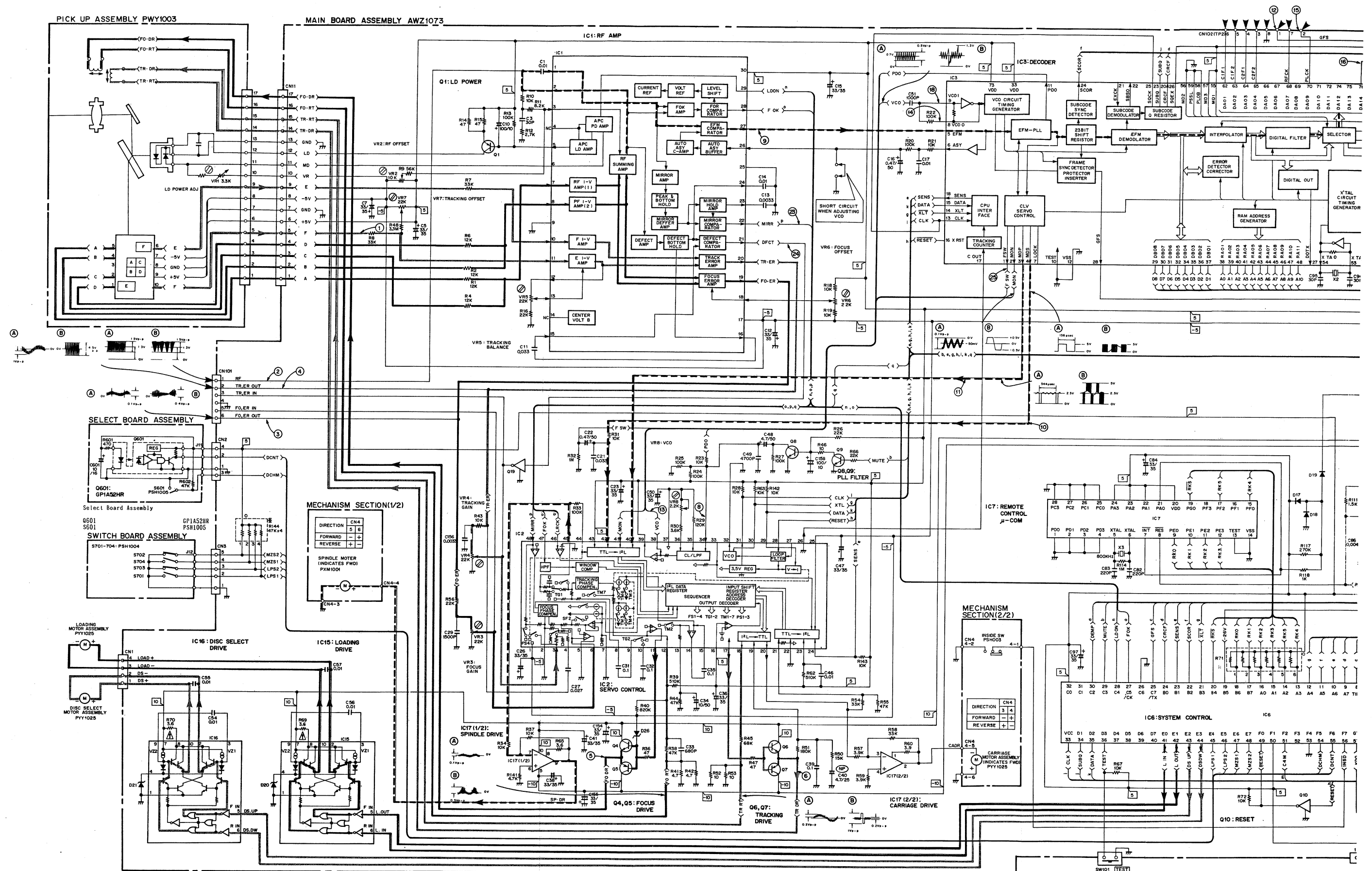
angle
: (C)

name plate
on
spacer
mechanism assembly
plate

former board
nbly



Schematic Diagram of PD-M40/KU type

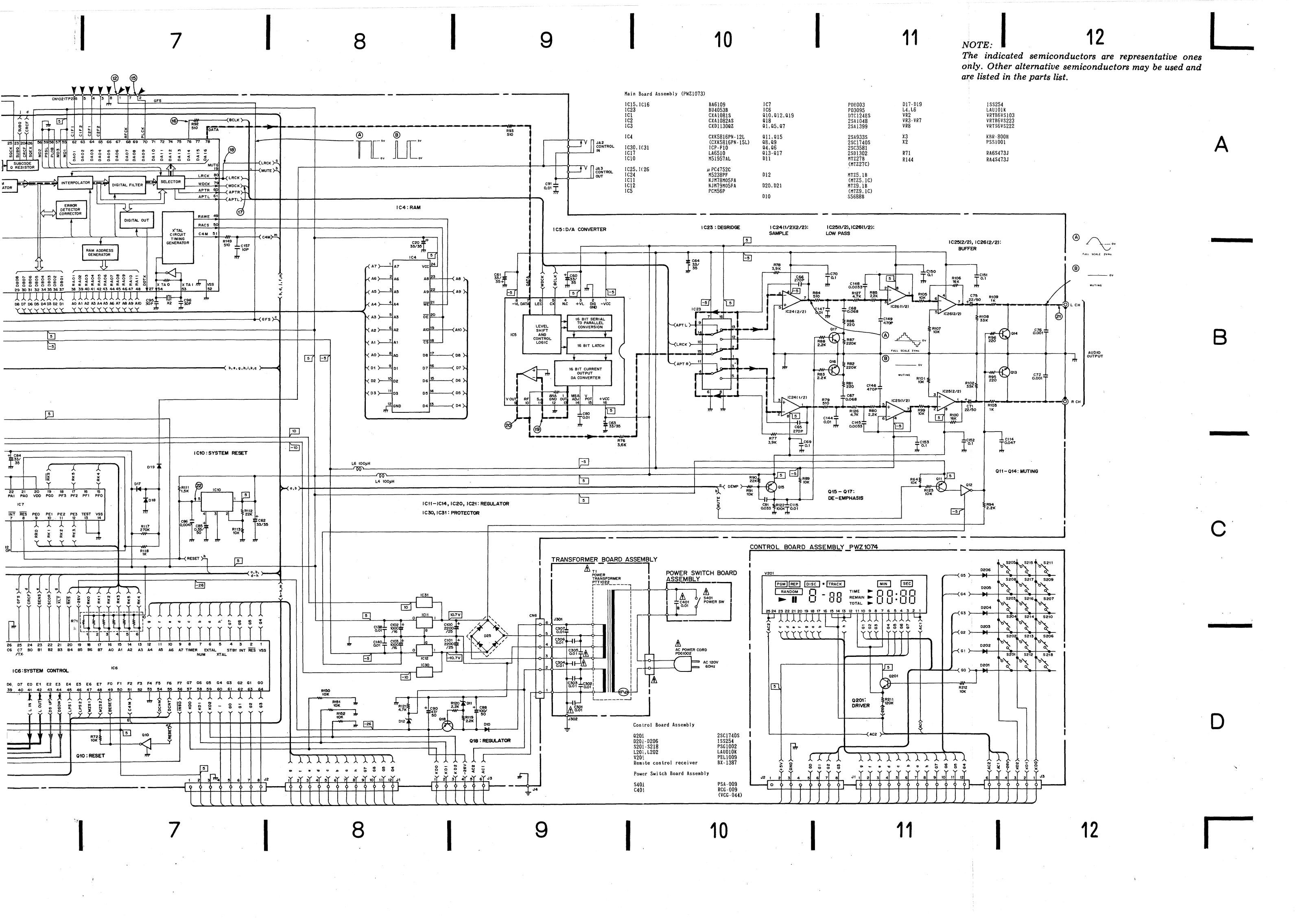


A

B

C

D



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.

Main Board Assembly (PWZ1073)

IC15, IC16	BA6109	IC7	PDE003	D17-D19	ISS254
IC23	BU4053B	IC6	P03095	L4, L6	LAU101K
IC1	CXA1081S	Q10, Q12, Q19	DTC124ES	VR2	VRT6V5103
IC2	CXA1082AS	Q4, Q6	2SA1048	VR3-VR7	VRT6V5223
IC3	CXA1304Z	Q1, Q5, Q7	2SA1399	VR8	VRT6V5222
IC4	CX5816PN-12L	Q11, Q15	2SA933S	X3	KBR-800H
IC30, IC31	(CX5816PN-15L)	Q8, Q9	2SC1740S	X2	PSS1001
IC17	ICP-F10	Q4, Q6	2SC3581	R71	RA6S473J
IC10	LA6510	Q13-Q17	2SD1302	R144	RA6S473J
IC25, IC26	M51957AL	D11	MT227B		RA6S473J
IC24	#PC4752C	D12	MT25.1B		
IC12	H5239PF	D20, D21	(MT25.1C)		
IC5	NJM78M05FA	D10	MT29.1B		
	PCM56P		(MT29.1C)		
			S568B		

IC5: D/A CONVERTER

IC23: DEGRIDGE

IC24(1/2), IC25(1/2): SAMPLE

IC25(1/2), IC26(1/2): LOW PASS

IC25(2/2), IC26(2/2): BUFFER

IC11-IC14, IC20, IC21: REGULATOR

IC30, IC31: PROTECTOR

TRANSFORMER BOARD ASSEMBLY

POWER SWITCH BOARD ASSEMBLY

CONTROL BOARD ASSEMBLY PWZ1074

Control Board Assembly

Q201	2SC1740S
D201-D206	ISS254
S201-S218	PSC1002
L201, L202	LAU101K
V201	PEL1009
Remote control receiver	BX-1387

Power Switch Board Assembly

S401	PSA-009
C401	RCC-009
	(VCC-044)

P. C. Board Patterns of PD-M40

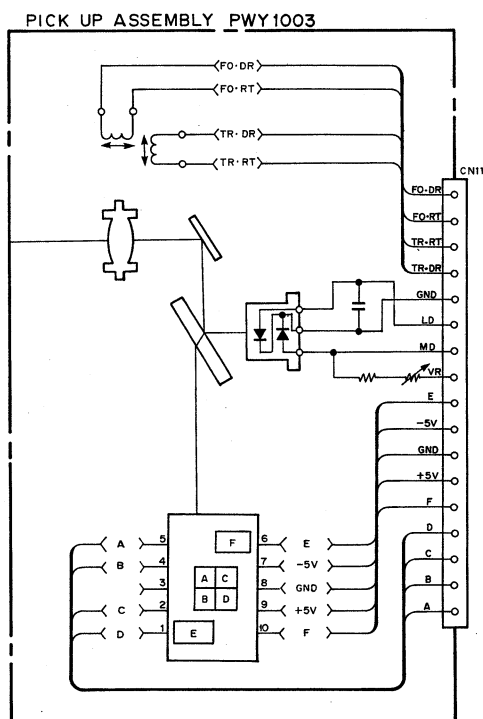
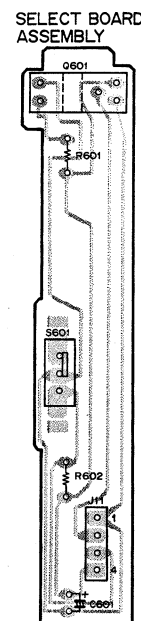
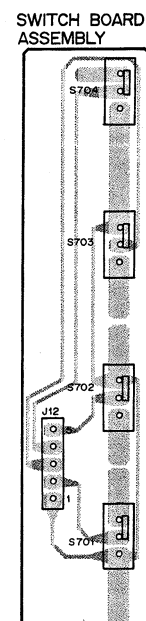
Note: P. C. Board connections of PD-M40 are the same as PD-M50.
Refer to PD-M50.

A

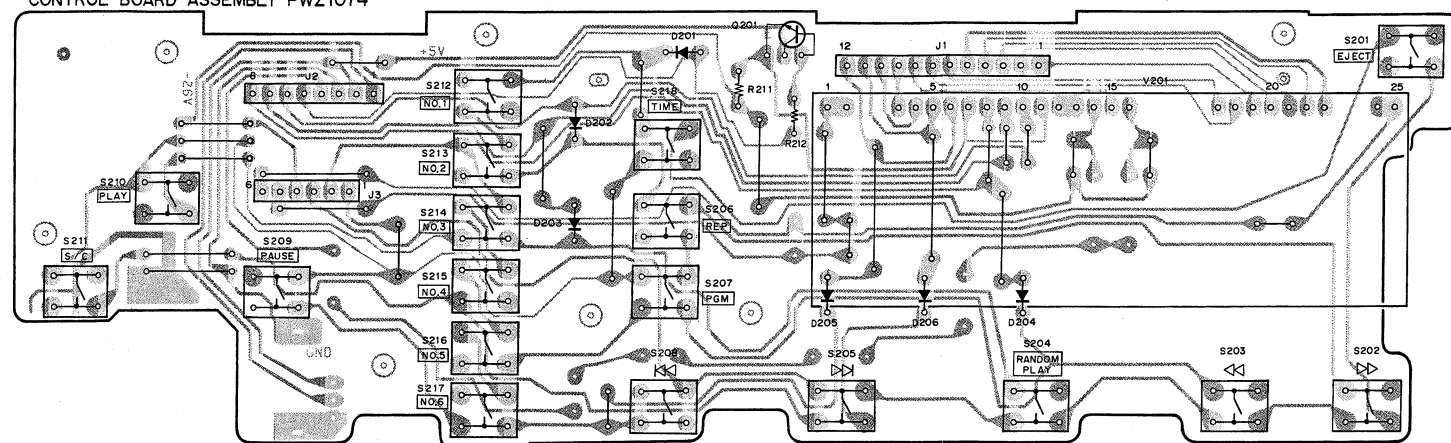
B

C

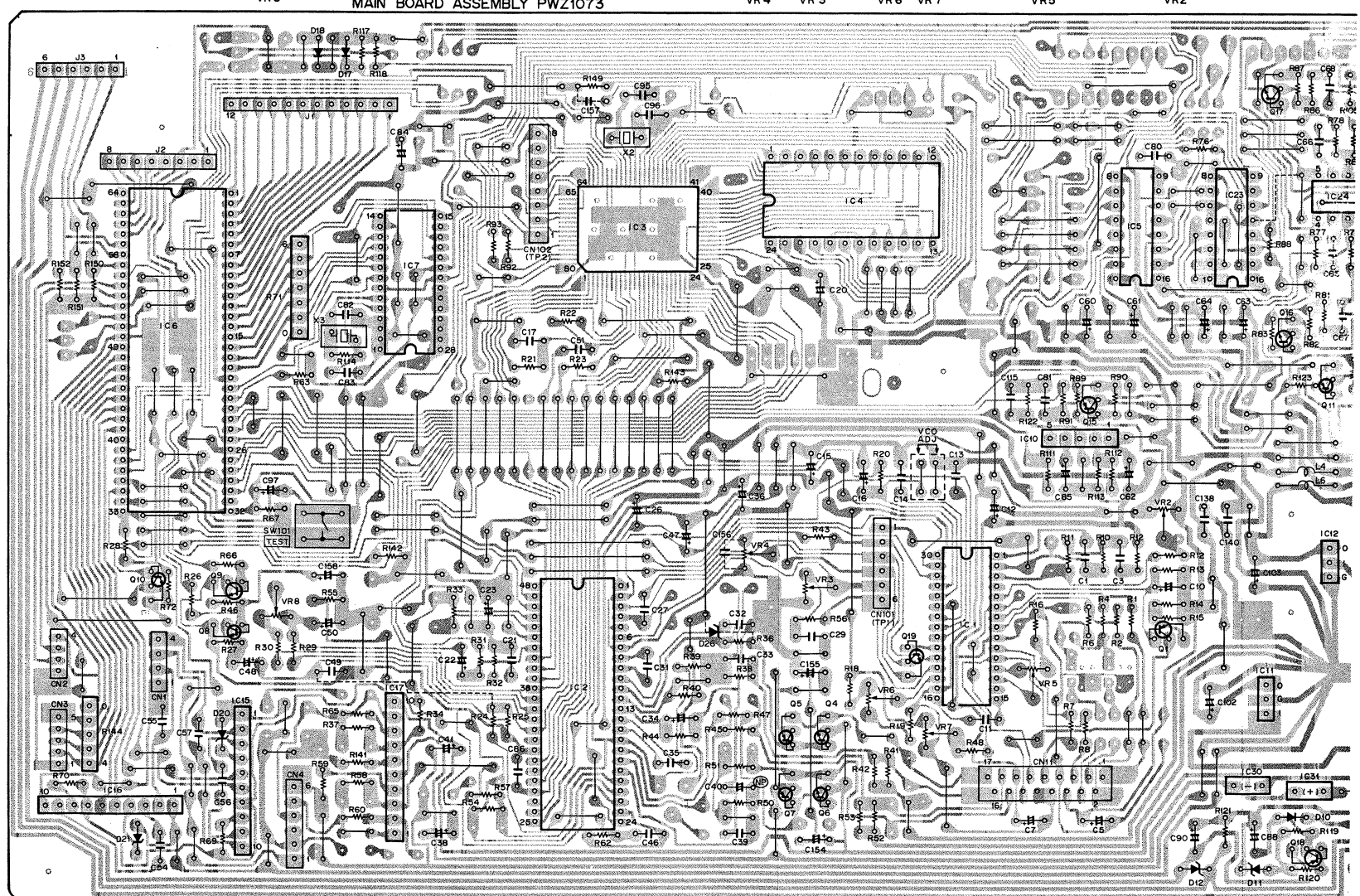
D



CONTROL BOARD ASSEMBLY PWZ1074



MAIN BOARD ASSEMBLY PWZ1073



4

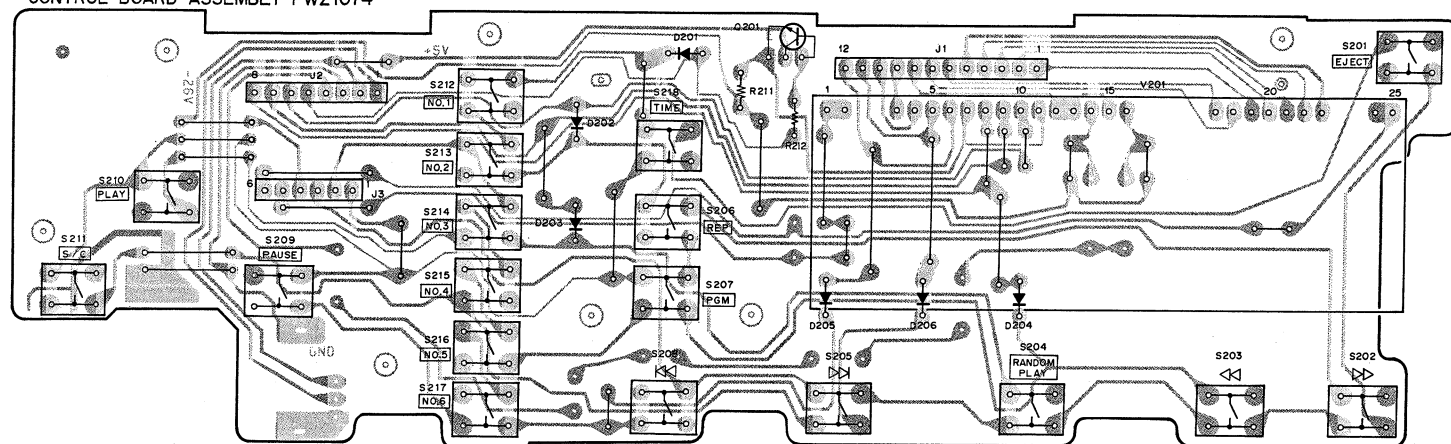
5

6

7

PD-M40/KU,KC,HEM,HP,SD,PD-M40-S/HEM

CONTROL BOARD ASSEMBLY PWZ1074



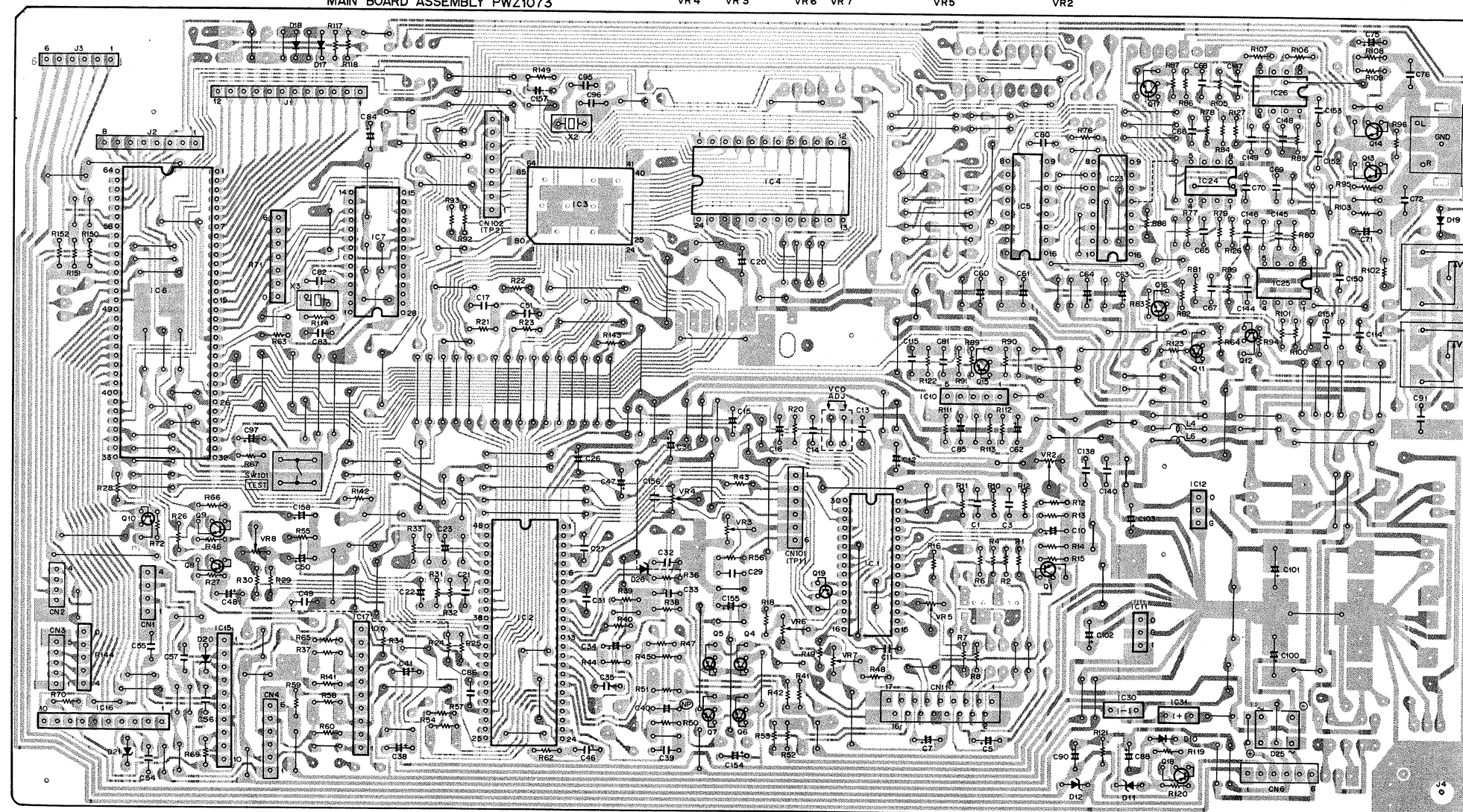
A

B

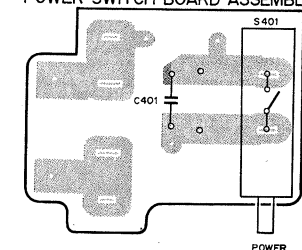
C

D

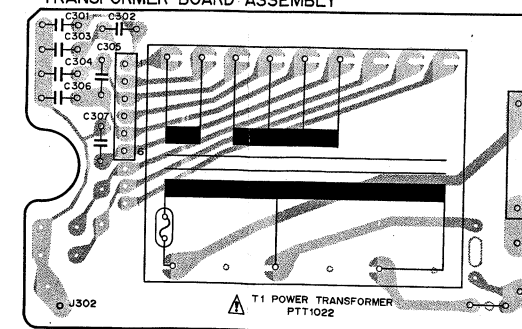
MAIN BOARD ASSEMBLY PWZ1073

JA1
AUDIO OUTPUTJA2
CONTROL INJA3
CONTROL OUT

POWER SWITCH BOARD ASSEMBLY



TRANSFORMER BOARD ASSEMBLY



4

5

6

7

8

9

91

215 : 4 (DISC No.)

216 : 5 (DISC No.)

217 : 6 (DISC No.)

218 : TIME

VER SWITCH BOARD ASSEMBLY

401 : POWER

ON - OFF

EJECT BOARD ASSEMBLY

601 : DISC SELECTOR

ON - OFF

(HOME POSITION SW)

(HOME POSITION -

OUTSIDE OF HOME POSITION)

MECHANISM BOARD ASSEMBLY

O1 (LPS1) :

} LOAD POSITION SW

O2 (LPS2) :

	STOP	During the loading	Clamp condition PLAY	during the eject
S701	ON (H)	OFF (L)	OFF (L)	ON (H)
S702	ON (H)	ON (H)	OFF (L)	OFF (L)

O3 (MZZ2) :

} MAGAZINE DISCRIMINATE SW

O4 (MZZ1) :

	NO MAGAZINE	SIX MAGAZINE	SINGLE
S703	ON (H)	OFF (L)	OFF (L)
S704	OFF (L)	ON (H)	OFF (L)

■ e underlined indicates the switch position.

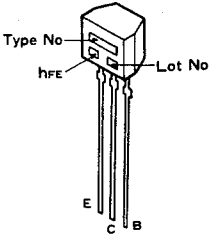
VE FORMS:

—PLAY mode. ⑧—SERCH mode.

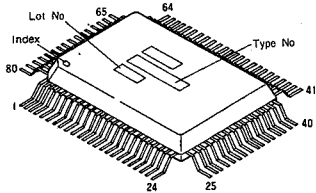
○ Itages and time values are general guide only.

External Appearance of Transistors and ICs

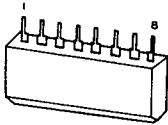
2SA1048



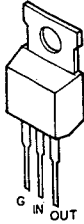
CXD1135Q



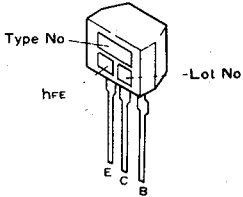
M5218L



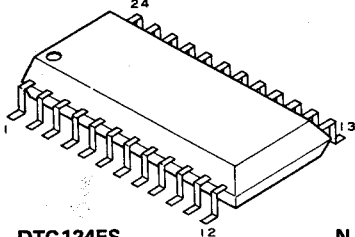
NJM79M05FA



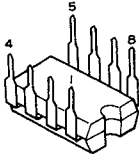
2SA933S
2SC1740S



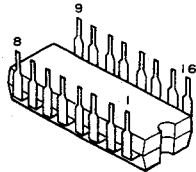
CXK5816PN-12L
CXK5816PN-15L



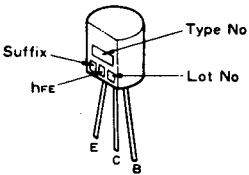
M5238PF



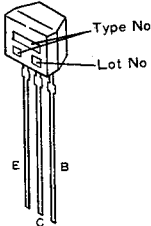
PCM56P-J



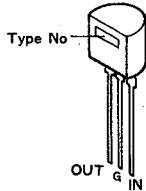
2SD1302



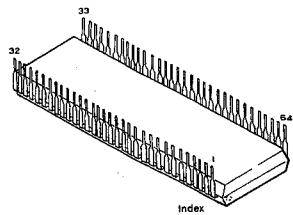
DTC124ES



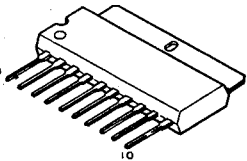
NJM78L05A



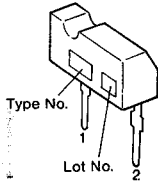
PD3095



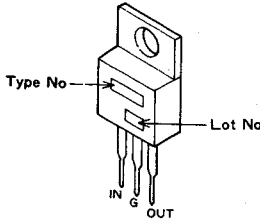
BA6109



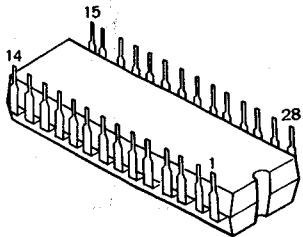
ICP-F10



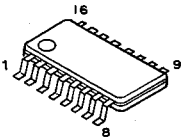
NJM78L12A



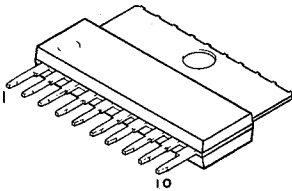
PDE003



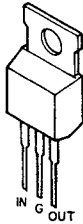
BU4053B



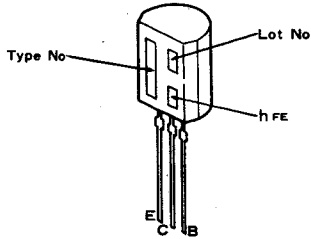
LA6510



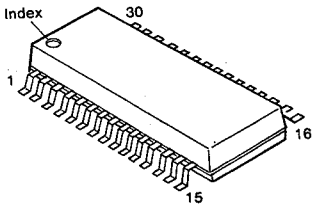
NJM78M05FA



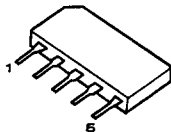
2SA1399
2SC3581



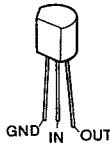
CXA1081S



M51957AL



NJM79L05A
NJM79L12A



9. ELECTRICAL PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★ **GENERALLY MOVES FASTER THAN ★**
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).

560 Ω	56 $\times 10^1$	561.....	RD1/4PS $\square$ $\square$ $\square$ J
47k Ω	47 $\times 10^3$	473.....	RD1/4PS $\square$ $\square$ $\square$ J
0.5 Ω	0R5.....		RN2H $\square$ $\square$ $\square$ K
1 Ω	010.....		RS1P $\square$ $\square$ $\square$ K

Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).
5.62k Ω 562 $\times 10^1$ 5621..... RN1/4SR $\square$ $\square$ $\square$ $\square$ F

Miscellaneous Parts

P.C. BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
Δ ●	Main board assembly	PWZ1159
●	Control board assembly	PWZ1160
Δ	Power switch board assembly	
Δ	Transformer board assembly	
	Headphone board assembly	
	Switch board assembly	
	Select board assembly	

OTHERS

Mark	Symbol & Description	Part No.
Δ	Strain relief	CM-22C
Δ	AC Power cord	PDG1002 (PDG1015)
★★	Motor assembly (DISC SELECT, DISC LOADING CARRIAGE)	PYY1025
★★	Spindle motor	PXM1001
★★	Remote control unit	PWW1008
	Pick up assembly	PWY1003
★★	Slide switch (INSIDE SW)	PSH1003

● Main Board Assembly (PWZ1159)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC15, IC16	BA6109
★★	IC23	BU4053B
★★	IC1	CXA1081S
★★	IC2	CXA1082AS
★★	IC3	CXD1135QZ
★★	IC4	CXK5816PN-12L (CXK5816PN-15L)
Δ ★★	IC30, IC31	ICP-F10

Mark	Symbol & Description	Part No.
Δ ★★	IC17	LA6510
★★	IC10	M51957AL
★★	IC24, IC25, IC26	M5238PF
★★	IC20	NJM78L05A
★★	IC13	NJM78L12A
Δ ★★	IC11	NJM78M05FA
★★	IC21	NJM79L05A
★★	IC14	NJM79L12A
Δ ★★	IC12	NJM79M05FA
★★	IC5	PCM56P-J
★★	IC7	PDE003
★★	IC6	PD3095
★★	Q10, Q12, Q19	DTC124ES
★★	Q18	2SA1048
★★	Q1, Q5, Q7	2SA1399
★★	Q11, Q15	2SA933S
★★	Q8, Q9,	2SC1740S
★★	Q4, Q6	2SC3581
★★	Q13, Q14, Q16, Q17	2SD1302
★	D11	MTZ27B (MTZ27C)
★	D12	MTZ5.1B (MTZ5.1C)
★	D20, D21	MTZ9.1B (MTZ9.1C)
★	D5—D8, D10	S5688B
★	D26	MTZ7.5A (MTZ7.5B)
★	D25	WL02-5004

COILS

Mark	Symbol & Description	Part No.
	L2, L3	LAU010K

SWITCH

Mark	Symbol & Description	Part No.
★★	SW101 Tact switch (TEST MODE SW)	PSG1002

CAPACITORS

Mark	Symbol & Description	Part No.
	C95, C96, C3	CCCCH300J50
	C82, C83	CCCSL221J50
	C40	CEANP4R7M25
	C85	CEASR33M50
	C49	CQMA472K50
	C157	CCCSL100D50
	C16, C22	CEASR47M50
	C34	CEAS100M50
	C10, C158	CEAS101M10
	C88	CEAS101M50
	C102, C103	CEAS102M16
	C146, C149	CQMA471J50
	C104, C105	CEAS102M25
	C71, C75	CEAS220M50
	C100, C101	CEAS222M25
	C5, C7, C12, C15, C20, C23, C26, C36, C38, C41, C47, C50, C60—C64, C84, C97	CEAS330M35
	C154, C155	
	C48	CEAS4R7M50
	C90	CEAS470M50
	C111, C112	CEAS471M16
	C106, C107	CEAS471M25
	C54—C57, C115, C138, C140	CKCYF103Z50
	C145, C148, C156	CQMA332J50
	C86, C114	CKCYF473Z50
	C51	CQMA102K50
	C1, C13, C17, C46, C80	CQMA103K50
	C14, C31, C32, C35, C39, C69, C70, C150—C153	CQMA104K50
	C29	CQMA152J50
	C21, C81	CQMA333K50
	C27	CQMA153K50
	C33	CQMA681K50
	C67, C68	CFTXA683J50
	C11	CQMA273J50
	C72, C76	CQSA102J50
	C65, C66	CQSA331J50
	C144, C147	CFTXA103J50

RESISTORS

Mark	Symbol & Description	Part No.
	R144	RA4S473J
	R71	RA6S473J
	R30	RN1/6PQ3601F
★	VR2 (Semi-fixed)	VRTB6VS103
★	VR3—VR7 (Semi-fixed)	VRTB6VS223
★	VR8 (Semi-fixed)	VRT6VS222
	Other resistors	RD1/6PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	JA1 2P pin jack (AUDIO OUTPUT)	VKB-006
★	X2 Ceramic resonator	KBR-800H
★	X3 Crystal sesonator	PSS-012

Mark	Symbol & Description	Part No.
	DL1, DL2	PTF1009

© Control Board Assmebly (PWZ1160) SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	Q201	2SC1740S
★	D201—D206	1SS254

SWITCHES

Mark	Symbol & Description	Part No.
★★	S201—S218 Tact switch EJECT, MANUAL SEARCH (◀), MANUAL SEARCH (▶), RANDOM PLAY, TRACK SERCH (◀◀), REPEAT, PGM MEMORY, TRACK SEARCH (▶▶), PAUSE, PLAY, S/C, 1 (TRACK No., DISC No.), 2 (TRACK No., DISC No.), 3 (TRACK No., DISC No.), 4 (TRACK No., DISC No.), 5 (TRACK No., DISC No.), 6 (TRACK No., DISC No.), TIME	PSG1002

COILS

Mark	Symbol & Description	Part No.
	L201, L202 (1μH)	LAU010K

CAPACITOR

Mark	Symbol & Description	Part No.
	C201	CKPUYF103Z25

RESISTORS

Mark	Symbol & Description	Part No.
	R212	RD1/6PM103J
	R211	RD1/6PM124J

OTHERS

Mark	Symbol & Description	Part No.
	V201 Fluoresent indicator	PEL1009
	Remote control receiver	BX-1387

Power Switch Board Assembly SWITCH

Mark	Symbol & Description	Part No.
★★	S401 Power switch (POWER)	PSA-009

CAPACITOR

Mark	Symbol & Description	Part No.
	C401 (0.01μF/AC400V)	RCG-009 (VCG-044)

Transformer Board Assembly

Transformer

Mark	Symbol & Description	Part No.
△ ★	T1 Power transformer (AC120V)	PTT1026

CAPACITORS

Mark	Symbol & Description	Part No.
△	C301, C304, C305, C309, C310	CKCYF103Z50
	C302, C303, C306—C308	CKCYF103Z50

Headphone Board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★★	IC501	M5218L

CAPACITORS

Mark	Symbol & Description	Part No.
	C501—C503	CKCYF473Z50
	C504, C505	CQMA104K50

RESISTORS

Mark	Symbol & Description	Part No.
★	VR501 Variable resistor (PHONES LEVEL 20K)	PCS1001
	Other resistors	RD1/6PM□□□J

OTHER

Mark	Symbol & Description	Part No.
	JA301 Jack (PHONES)	PKN1001

Switch Board Assembly

SWITCHES

Mark	Symbol & Description	Part No.
★★	S701—S704 Slide switch	PSH1004

Select Board Assembly

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★★	Q601	GP1A52HR

SWITCH

Mark	Symbol & Description	Part No.
★★	S601 Slide switch (MODE)	PSH1005

CAPACITOR

Mark	Symbol & Description	Part No.
	C601	CEAL100M16

RESISTORS

Mark	Symbol & Description	Part No.
	All resistors	RD1/6PM□□□J

10. ADJUSTMENTS

The adjustment items of this model should be performed in the order as shown below.

• Adjustment Items

1. Tracking error offset, focus offset and RF offset adjustments
2. LD (Laser Diode) output power confirmation
3. Focus lock and spindle lock confirmation
4. Grating adjustment
5. Tracking balance adjustment
6. Tangential adjustment
7. RF level confirmation
8. Focus gain adjustment
9. Tracking gain adjustment
10. VCO free-run frequency adjustment

• Measuring Equipment

1. Dual trace oscilloscope
2. Laser power meter
3. Test disc (YEDS7)
4. Tracking balance adjustment filter
5. Loop gain adjustment filter
6. Signal generator
7. Frequency counter
8. Other general tools

• Test Mode

All the adjustments should be performed in Test Mode.

Test Mode setting and cancellation procedures

- (1) To set the Test Mode, turn the POWER switch of the player (SW101) ON pushing the TEST MODE SWITCH.
- (2) To cancel the Test Mode, simply turn the POWER switch of the player OFF.

The various key functions in the Test Mode are listed in Table 10-1.

• Adjusting Points

- VR1: Laser power
 VR7: Tracking offset (TRK.OFS)
 VR3: Focus gain (FCS.GAN)
 VR4: Tracking gain (TRK.GAN)
 VR5: Tracking balance (TRK.BAL)
 VR6: Focus offset (FCS.OFS)
 VR8: VCO adjustment (VCO.ADJ)
 VR2: RF offset (RF.OFS)

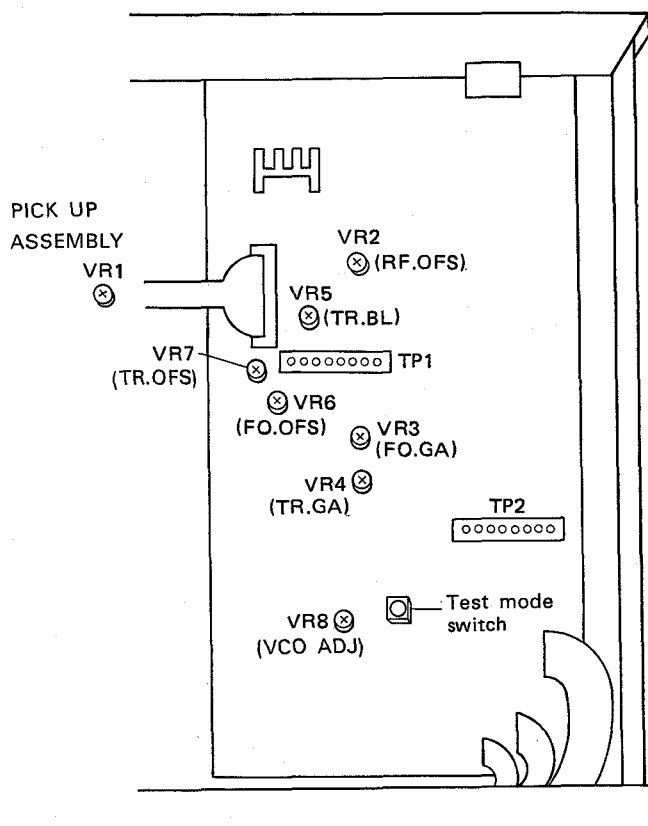


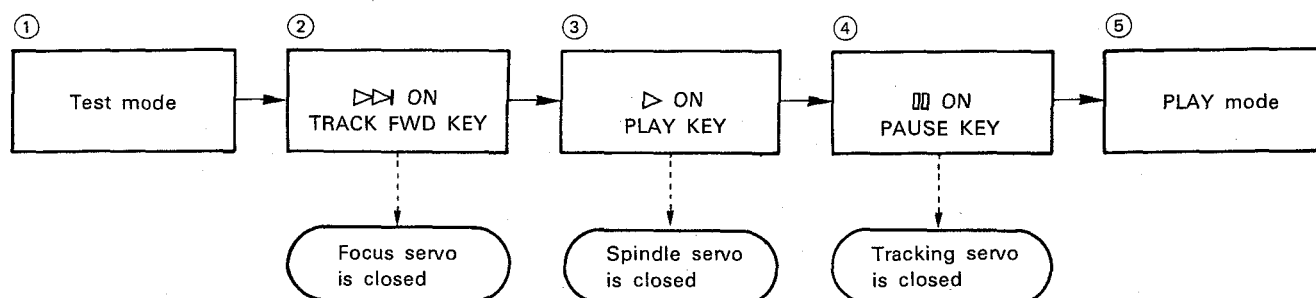
Fig. 10-1 Adjusting point

In the Test Mode, each servo circuit can be closed and opened by separate operations. Consequently, each servo must be closed one at a time (in serial sequence) to set PLAY mode.

Note that PLAY mode is not activated by simply pressing the PAUSE key () in the Test Mode.

Example: Switching from STOP to PLAY mode.

* The each servo mechanisms operate in a serial sequence in the Test Mode.

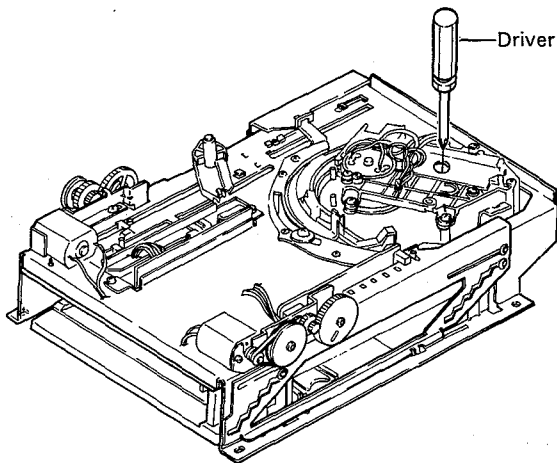
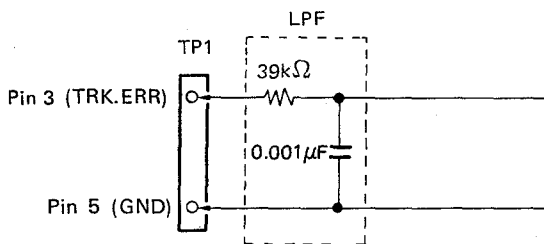


• Key Functions in Test Mode

Symbol	Key name	Function during test mode	Description
	TRACK BACK	Laser diode turned ON.	Laser diode lights up.
	TRACK FWD	Focus servo is closed.	Laser diode lights up. Actuator is moved up/down, then focus servo is closed.
	PLAY	Spindle servo is closed.	Spindle starts to rotate and the servo is closed when it turns into the CLV-A servo mode.
	PAUSE	Tracking servo is closed/opened.	Performs toggle operation. Closing the tracking servo and becomes PLAY mode by depressing the key (Focus servo and spindle servo must be closing), and PAUSE indicator lights up. Tracking servo opens by depressing the key again.
	MANUAL SEARCH REV	Carriage moves in reverse direction. (towards disc center)	Carriage is moved towards disc center at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
	MANUAL SEARCH FWD	Carriage moves in forward direction. (towards disc end)	Carriage is moved towards disc end at a fast speed of about 3 cm/sec. Since there is no safety mechanism to stop the carriage, release the key when the carriage reaches the end.
	STOP	STOP	All servos are opened.
	OPEN/CLOSE	(Disc tray) OPEN/CLOSE	Disc tray is opened and closed. However, pickup does not return to the park position. Moreover, even when disc is closed the pickup remains as is.

Table 10-1

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
1	TRACKING ERROR OFFSET, FOCUS OFFSET AND RF OFFSET ADJUSTMENT					
			TP1 PIN 2 (TRK.ERR) TP1 PIN 6 (FCS.ERR) TP1 PIN 1 (RF. OUTPUT)	VR5 (TRK.BAL) VR7 (TRK.OFS) VR6 (FCS.OFS) VR2 (RF.OFS)	45° 0V±50 mV FOCUS offset 0V±50 mV RF offset 100 mV±50 mV	• Set to TEST mode. (See page 42.) • Turn VR5 TRK.BAL (Tracking balance) volume clockwise 45° from the center. • Adjust with VR7 TRK OFS (Tracking error offset) volume so that the voltage of pin 3 TRK.ERR (Tracking error) of TP1 becomes 0V±50 mV. • Adjust VR6 FCS.OFS (focus offset) so that the FCS.ERR (focus error) voltage at TP1 pin 6 becomes 0V±50 mV. • Adjust VR2 RF.OFS (RF offset) so that the RF output voltage at TP1 PIN 1 becomes 100 mV±50 mV.
2	LD (LASER DIODE) OUTPUT POWER CONFIRMATION					
				VR1	Specification: 0.13 mW±0.01 mW	• Set to TEST mode. (See page 42.) • Press TRACK BACK key (◀◀) and turn ON LD (laser diode). • Place sensor of the laser power meter immediately above the object lens and confirm that the output power of the LD is within 0.13 mW±0.01 mW. • If power is out of the specified range, adjust it with the LD OUTPUT POWER ADJ VR1 variable resistor.
3	FOCUS LOCK AND SPINDLE LOCK CONFIRMATION					
	V 0.5V/div	H 100 msec/div	TP1 Pin 1 (RF output)		RF output exists Normal rotation	• Set TEST disc. • Set to TEST mode. (See page 42.) • Shift the pickup close to the center of the disc by pressing the MANUAL SEARCH FWD key (▶▶). * Note that this step must be performed. • Observe pin 1 RF (RF output) of TP1 with an oscilloscope and confirm that the RF signal is output after pressing the TRACK FWD key (▶▶). • Press PLAY key (▶) and be sure that the disc rotates in normal direction at almost the specified speed (as it is close to the center of the disc, the rotating speed is around 30 rpm) and not rotates abnormally or inversely.

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
4	GRATING ADJUSTMENT					
	 Fig. 10-2  Fig. 10-3					• Set to TEST mode. (See page 42.) • Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷) so that the grating adjustment screw of the pickup can be seen through the oval hole of the upper side of the servo mechanism. • Insert a grating driver () into the adjusting hole from the upper side of the mechanism as shown in Fig. 10-2, and confirm that the grating screw turns. • Press TRACK FWD key (▷▷) and PLAY key (▷) sequentially and close the focus servo and spindle servo. (Do not close the tracking servo.) • Observe the waveform of pin 3 TRK.ERR (Tracking error) of TP1 with an oscilloscope. At this point, insert a 4 kHz cutoff low-pass filter. (Fig. 10-3)
0.5V/div	5 ms/div	TP1 Pin 2 TRK.ERR	Grating Grating	Null point Maximum amplitude	• Turn a grating driver and find null point (Photo. 10-1). • Then, turn slowly the grating driver clockwise from the null point and adjust at the point where the waveform (Tracking error signal) firstly becomes maximum amplitude. (See Photo. 10-3.) Note: If the grating driver is pressed strongly, the pickup moves toward disc center, accordingly adjustment becomes difficult. • Finally, be sure to confirm that the tracking error signal (at this time, 4 kHz of cutoff low-pass filter is not inserted) when the pickup is moved toward the disc center and the P-P voltage of the tracking error signal at the outer circumference of the disc are not varied greatly. When the level is deviated over ±10%, adjust again by turning grating screw to the maximum error amplitude point.	

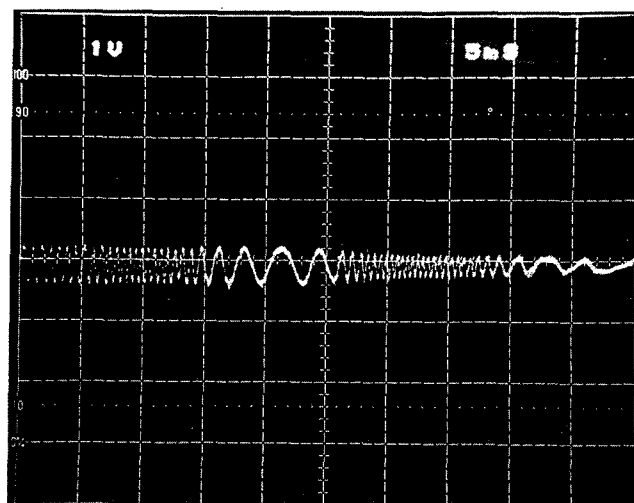


Photo. 10-1. Null point

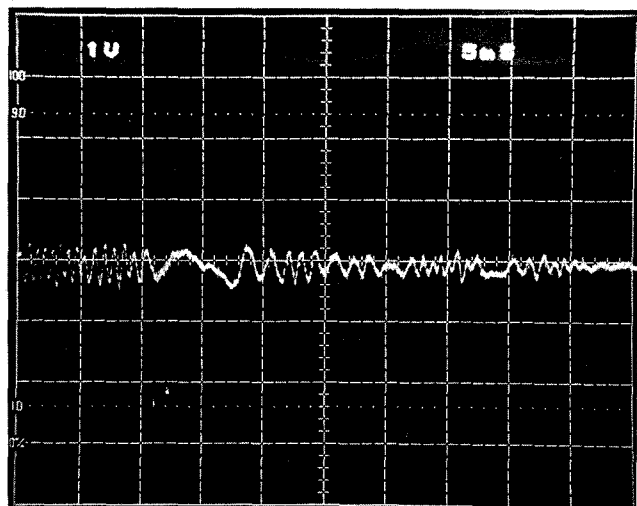


Photo. 10-2. Waveform of not null point

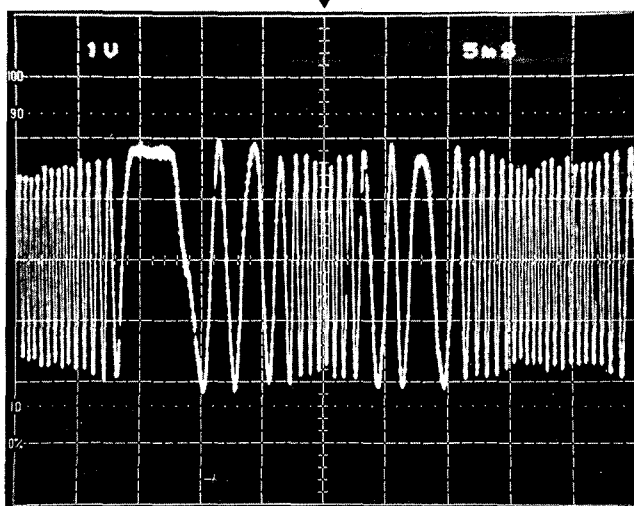
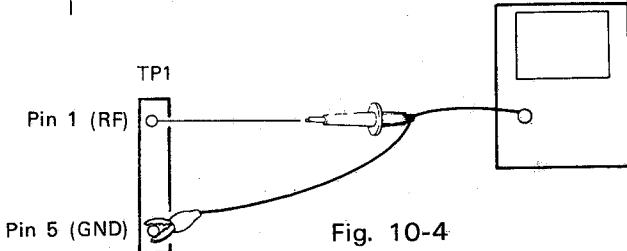


Photo. 10-3. Maximum amplitude

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
6	TANGENTIAL ADJUSTMENT					
		200nS	TP1 Pin 1 (RF output)	Tangential adjustment screw	Best eye pattern	• Set the TEST disc. • Set to TEST mode. (See page 42) • Shift the pickup close to the center of the disc by pressing MANUAL SEARCH FWD key (▷▷). • Press TRACK FWD key (▷▷), PLAY key (▷) and PAUSE key (⏏) sequentially, and close all the servos. (Pause indicator lights up.) • Observe pin 1 RF (RF output) of TP1 with an oscilloscope and adjust with the tangential screw so that the eye pattern becomes clear. (Fig. 10-4) • The adjusting point is the middle point between the point where the eye pattern becomes deteriorate by turning the tangential screw clockwise and the point where the eye pattern becomes deteriorate by turning the tangential screw counterclockwise. As a criterion, observe that the overall waveform is clear and one of the diamond shapes within the eye pattern (Photo. 10-6), and adjust at as an optimum point where the diamond shape is seen relatively fine line.  Fig. 10-4 Note: During the adjustment, hold hexagonal wrench to upward so as to keep the pickup body not goes down.

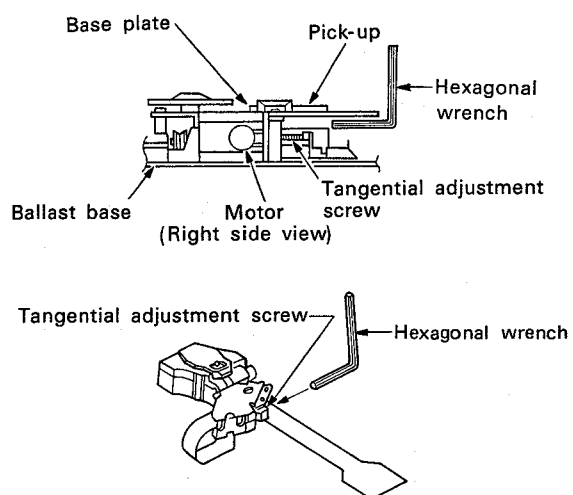


Fig. 10-5 Tangential adjustment

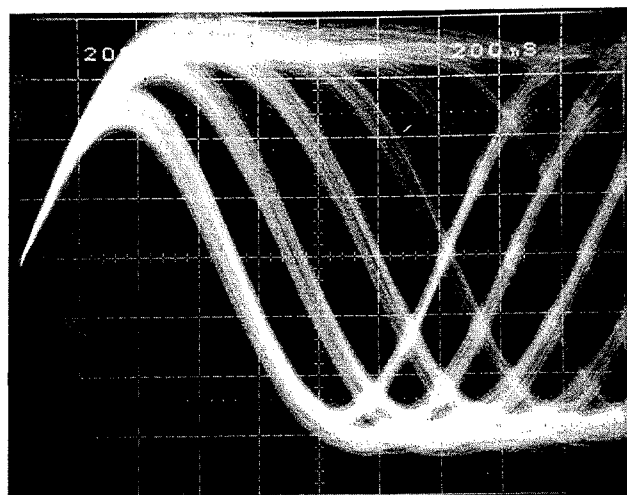
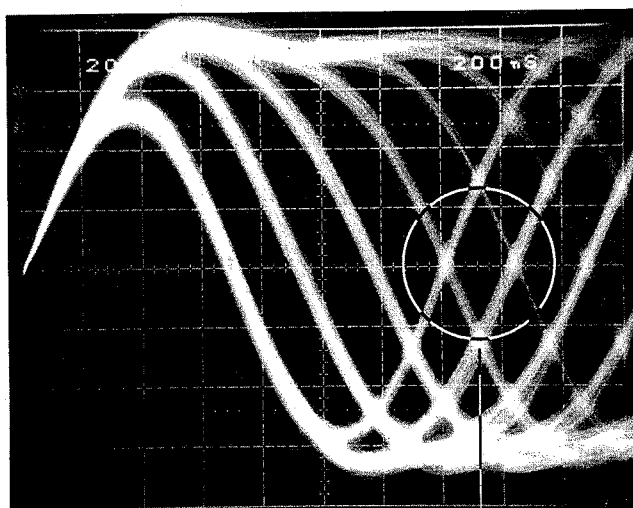


Photo. 10-7



Part to be observed

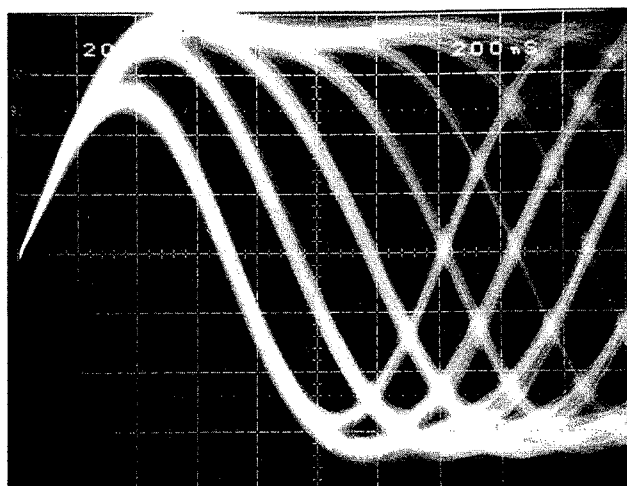


Photo. 10-8

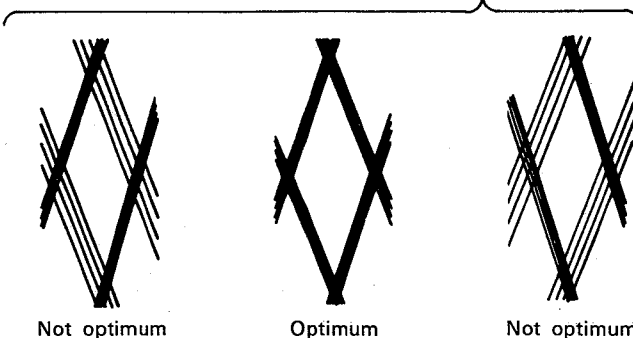


Photo. 10-6

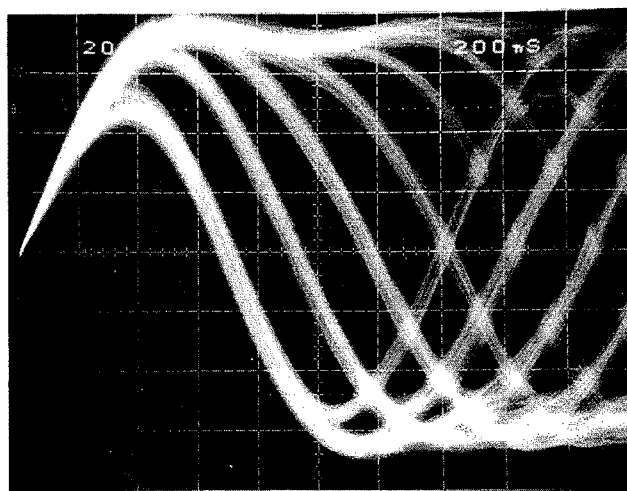


Photo. 10-9

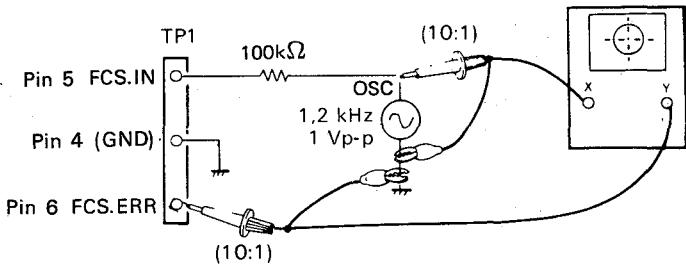
Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
7	RF LEVEL CONFIRMATION					
			TP1 Pin 1 (RF)	VR1 Laser power	2.0Vp-p ±0.6Vp-p	- Set to TEST mode. (See page 42) - Play TEST disc and connect probe of an oscilloscope to pin 1 RF (RF output) of TP1 and measure the P-P voltage of RF waveform. - Confirm that the value is within 2.0V±0.6 Vp-p. - In case it is over 2.6 Vp-p, adjust it to the specified range.
8	FOCUS GAIN ADJUSTMENT					
	20mV/div.5/mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)	X axis TP1 Pin 5 (FCS.IN) Y axis TP1 Pin 6 (FCS.ERR)	VR3 (FCS.GAIN)	Phase difference 90°	- In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 10-6. - Set to TEST mode. (See page 42) - Press TRACK FWD key (▶▶), PLAY key (▶) and PAUSE key (⏸) sequentially, and turn ON the each servos of focus, spindle and tracking. - Turn the POWER of oscillator ON and output 1.2 kHz 1 Vp-p. Note: (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.) - Adjust with VR3 FCS.GAN (Focus gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (Phase difference 90°).	

Fig. 10-6

Fig. 10-6

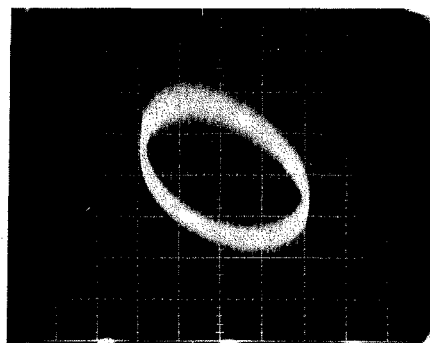


Photo. 10-10 High gain

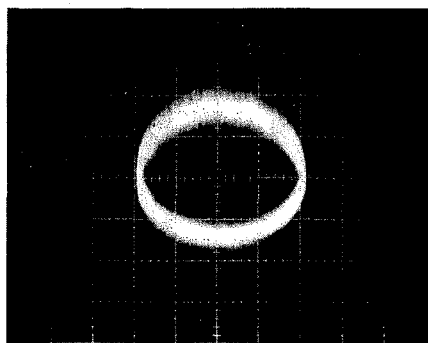


Photo. 10-11 Optimum gain

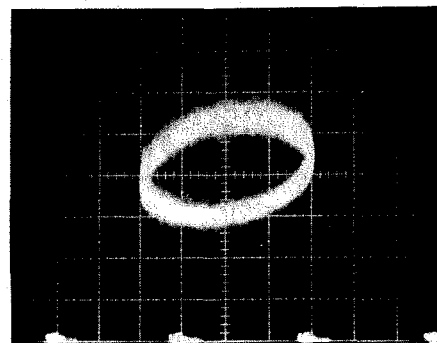


Photo. 10-12 Low gain

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
9 TRACKING GAIN ADJUSTMENT						
	50 mV/div.5mV/div. CH1 (X), CH2 (Y) (Probe 10 : 1)	X axis TP1 Pin 3 (TRK.IN) Y axis TP1 Pin 2 (TRK.ERR)	VR4 (TRK.GAN)	Phase difference 90°	- In the POWER OFF state, connect an oscilloscope and oscillator as shown in Fig. 10-7. - Set to TEST mode. (See page 42) - Press TRACK FWD key (▶▶), PLAY key (▶) and PAUSE key (⏏) sequentially, and turn ON the each servos of focus, spindle and tracking. - Turn the POWER of oscillator ON and output 1.2 kHz 2 Vp-p. - Note: (Depending upon oscillators, some of them output DC when their power turned ON. Therefore, it is desirable to connect oscillator after turning the power ON.) - Adjust with VR4 TRK GAN (Tracking gain) volume so that the lissajous figure of the oscilloscope becomes horizontal circle (phase difference 90°).	

Fig. 10-7

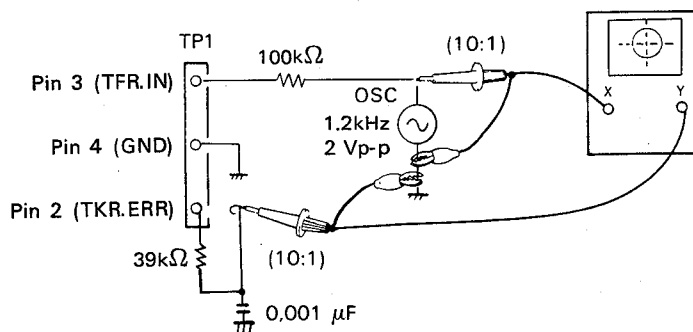


Fig. 10-7

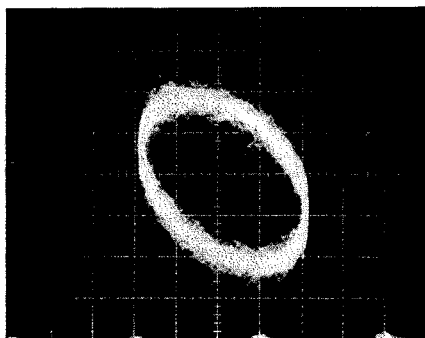


Photo. 10-13 High gain



Photo. 10-14 Optimum gain

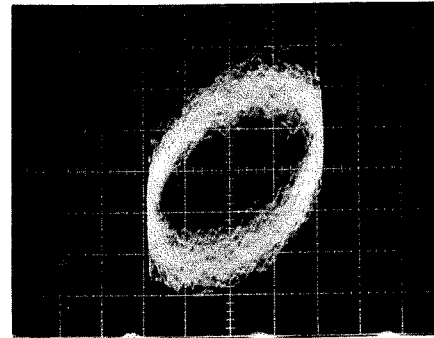
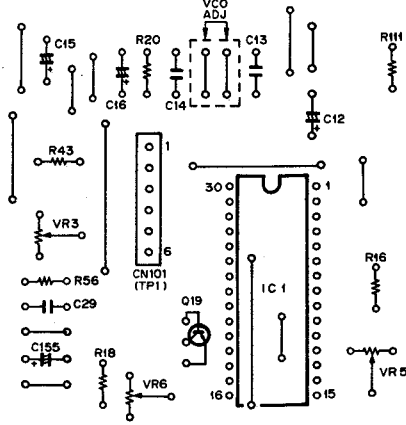


Photo. 10-15 Low gain

Step No.	Oscilloscope Setting		Test Points	Adjusting Points	Check items/ Adjustment specifications	Adjustment procedure
	V	H				
10	VCO FREE RUN FREQUENCY ADJUSTMENT					
			TP2 Pin 2	VR8 (VCO.ADJ)	4.375 ±0.025 MHz	• Set to TEST mode. (See page 42) • Short-circuit between ASY and GND jumper with grating driver, etc. (Fig. 10-8) • Connect frequency counter, which is measurable over 10 MHz, to pin 2 of TP2. • Adjust with VR8.VCO ADJ (VCO adjustment) volume so that the value of frequency counter becomes 4.375±0.025 MHz.  Fig. 10-8
11	METHOD TO CONFIRM S CHARACTER (FOCUS ERROR)					
						• Set to TEST mode. (See page 42) • Short-circuit between pin 6 FCS, IN (Focus in) of TP1 and GND. • Press TRACK FWD key (▶▶) and observe the waveform of pin 7 FCS.ERR (Focus error) of TP1 at that time with an oscilloscope.

10. RÉGLAGES

Les réglages pour ce modèle doivent être réalisés dans l'ordre indiqué ci-dessous.

• Réglage à effectuer

1. Réglages de l'offset d'erreur de suivi, de l'offset de focalisation et de l'offset HF.
2. Vérification de la puissance de sortie de la diode laser (LD)
3. Vérification du verrouillage de focalisation et du verrouillage de moyeu
4. Réglage du réseau
5. Réglage de l'équilibrage de centrage de piste
6. Réglage tangentiel
7. Vérification du niveau RF
8. Réglage du gain de focalisation
9. Réglage du gain de centrage de piste
10. Réglage de la fréquence propre du VCO

• Matériel de mesure

1. Oscilloscope double trace
2. Appareil de mesure pour puissance laser
3. Disque d'essai (YEDS7)
4. Filtre de réglage pour équilibrage de centrage de piste
5. Filtre de réglage pour gain de boucle
6. Générateur de signal
7. Fréquence-mètre
8. Outillage général divers

• Mode d'essai

Tous les réglages doivent être réalisés dans le mode d'essai (Test Mode).

Méthodes de réglage et d'annulation du mode d'essai

- (1) Pour régler le mode d'essai, placer l'interrupteur d'alimentation (POWER) du lecteur (SW101) sur la position de marche (ON) en appuyant sur l'interrupteur de mode d'essai (TEST MODE SWITCH).
- (2) Pour annuler le mode d'essai, amener simplement l'interrupteur d'alimentation (POWER) du lecteur sur la position d'arrêt (OFF).

Les différentes fonctions des touches dans le mode d'essai sont indiquées dans le tableau 10-1.

• Points de réglage

- VR1: Puissance laser
 VR7: Décalage de centrage de piste (TRK.OFS)
 VR3: Gain de focalisation (FCS.GAN)
 VR4: Gain de centrage de piste (TRK.GAN)
 VR5: Equilibrage de centrage de piste (TRK.BAL)
 VR6: Décalage de focalisation (FCS.OFS)
 VR8: Réglage du VCO (VCO.ADJ)
 VR2: Offset RF (RF.OFS)

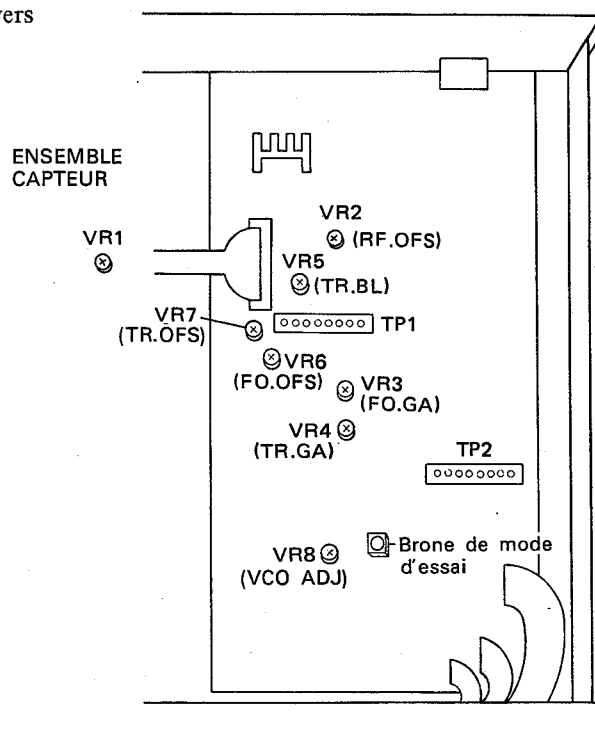


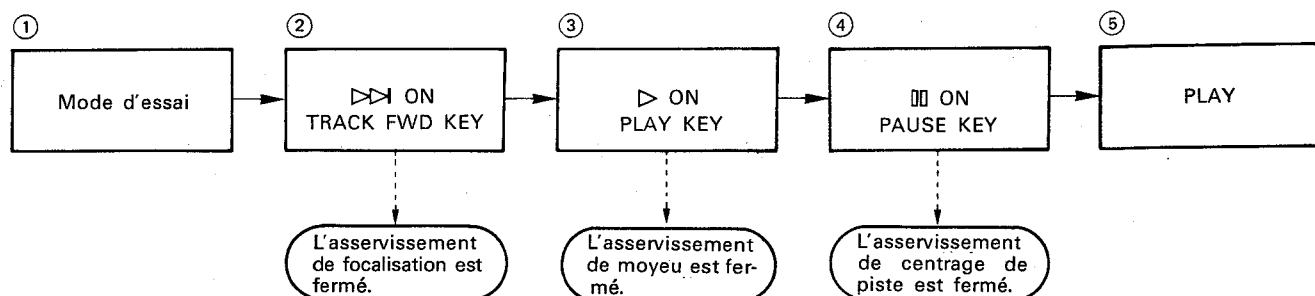
Fig. 10-1 Point de réglage

Dans le mode d'essai (Test Mode), chaque circuit asservi peut être fermé ou ouvert au moyen d'opérations séparées. En conséquence, les asservissements doivent être fermés l'un après l'autre (séquentiellement) pour régler le mode de lecture (PLAY).

Note: Le mode de lecture (PLAY) n'est pas simplement mis en oeuvre par l'enfoncement de la touche PAUSE () dans le mode d'essai.

Exemple: Commutation du mode d'arrêt (STOP) au mode de lecture (PLAY).

* Dans le mode d'essai (Test Mode), chaque servomécanisme agit séquentiellement.

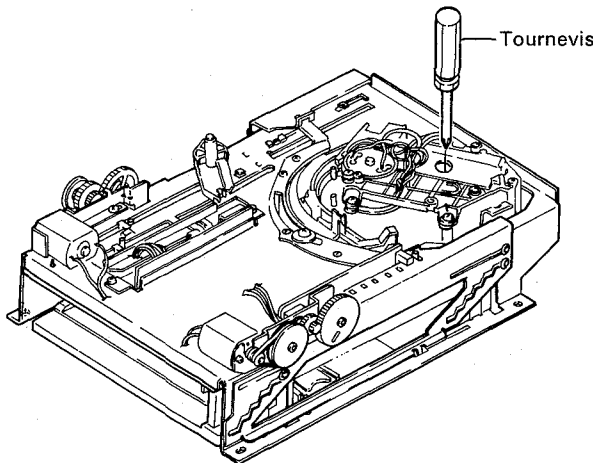
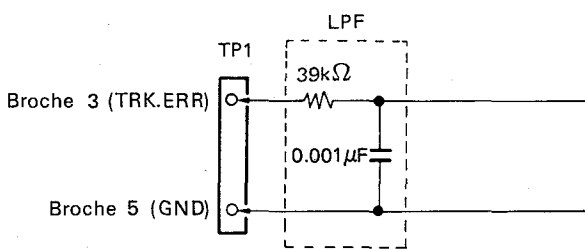


• Fonction des touches dans le mode d'essai (Test Mode)

Symbole	Désignation de touche	Fonction pendant le mode d'essai	Description
	TRACK BACK	Diode laser allumée	La diode laser s'allume.
	TRACK FWD	Asservissement de focalisation fermé	La diode laser s'allume. Le moteur d'asservissement se déplace vers le haut/bas, puis l'asservissement de focalisation est fermé.
	PLAY	Asservissement de moyeu fermé	Le moyeu commence à tourner et l'asservissement est fermé lorsqu'il passe dans le mode CLV-A.
	PAUSE	Asservissement de centrage de piste ouvert/fermé	Réalise l'opération de bascule. Fermeture de l'asservissement de centrage de piste et passage en mode de lecture (PLAY) en appuyant sur la touche (l'asservissement de focalisation et l'asservissement de moyeu doivent se fermer); le voyant de PAUSE s'allume. L'asservissement de centrage de piste s'ouvre par une nouvelle pression sur la touche.
	MANUAL SEARCH REV	Le chariot se déplace en arrière (vers le centre du disque).	Le chariot se déplace vers le centre du disque à une vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
	MANUAL SEARCH FWD	Le chariot se déplace en avant (vers le centre du disque).	Le chariot se déplace vers la fin du disque à la vitesse élevée d'environ 3 cm/s. Comme il n'y a pas de dispositif de sécurité, relâcher la touche dès que le chariot arrive en fin de course.
	STOP	Arrêt	Tous les asservissements sont ouverts
	OPEN/CLOSE	Ouverture/fermeture du plateau de disque	Le plateau de disque est ouvert et fermé. Néanmoins, la tête de lecture ne revient pas sur sa position de repos. De plus, même lorsque le disque est enfermé, la tête de lecture demeure tel quel.

Tableau 10-1

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
1.	RÉGLAGES DE L'OFFSET D'ERREUR DE SUIVI, DE L'OFFSET DE FOCALISATION ET DE L'OFFSET HF					
			TP1 broche 2 (TRK.ERR) TP1 BROCHE 6 (FCS.ERR) TP1 BROCHE 1 (RF OUTPUT)	VR5 (TRK.BAL) VR7 (TRK.OFS) VR6 (FCS.OFS) VR2 (RF.OFS)	45° 0V±50 mV Offset de focalisation 0V±50 mV Offset RF 100 mV±50 mV	• Régler le mode d'essai (TEST). (Voir page 53.) • Tourner le potentiomètre VR5 TRK.BAL (équilibrage de centrage de piste) de 45° depuis le centre dans le sens des aiguilles d'une montre. • Ajuster le potentiomètre VR7 TRK.OFS (décalage d'erreur de centrage de piste) de façon à ce que la tension à la broche 3 TRK.ERR (erreur de centrage de piste) de TP1 deviennent égale a 0V±50 mV. • Régler VR6 FCS.OFS (offset de focalisation) de manière à oe que la tension de FCS.ERR (erreur de focalisation) relevée sur la broche 6 de TP1 moit de 0V±50 mV. • Régler VR2 RF.OFS (offset HF) de manière à ce que la tension de RF OUTPUT (sortie HF) relevée sur la broche 1 de TP1 soit de 100 mV±50 mV.
2.	CONTRÔLE DE LA PUISSANCE DE SORTIE DE LA DIODE LASER (LD)					
				VR1	Spécification: 0,13 mW±0,01 mW	• Régler le mode d'essai (TEST). (Voir page 53.) • Appuyer sur la touche de centrage de piste arrière (TRACK BACK) (⏮) et enclencher la diode laser (LD). • Placer la capteur de l'instrument destiné à mesure la puissance laser au dessus de l'objectif et vérifier que la puissance de sortie de la diode laser (LD) est de 0,13 mW±0,01 mW. • Si la puissance de sortie se trouve en dehors des tolérances, la régler à l'aide de la résistance variable de réglage de la puissance de sortie de la diode laser (LD OUTPUT POWER ADJ VR1).
3.	CONTRÔLE DU VERROUILLAGE DE FOCALISATION ET DU VERROUILLAGE DE MOYEU					
	V 0,5 V/div.	H 100 ms/div.	TP1 broche 1 (sortie RF)		Présence de sortie RF Rotation normale	• Mettre en place le disque d'essai (TEST). • Régler le mode d'essai (TEST). (Voir page 53.) • De 38 placer la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche (MANUAL SEARCH FWD (⏭)). * Cette étape doit absolument être réalisée. • Observer le signal RF a 58 la broche 1 de TP1 (sortie RF) au moyen d'un oscilloscope et vérifier que le signal RF sorte après l'enfoncement de la touche d'avance de piste TRACK FWD (⏭). • Appuyer sur la touche de lecture (PLAY) (▶) et s'assurer que le disque tourne en sens normal avec approximativement la vitesse spécifiée (étant près du centre du disque, la vitesse de rotation est d'environ 30 tr/mn), sans anomalie ni inversion du sens de rotation.

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
4. RÉGLAGE DE LA MIRE						
						 Fig. 10-2  Fig. 10-3
0,5 V/div.	5 ms/div.	TP1 Broche 2 TRK.ERR	Réseau Réseau	Point zéro Amplitude maximum		• Régler le mode d'essai (TEST). (Voir page 53.) • Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (▷▷), de façon à ce que la vis de réglage du réseau de la tête de lecture puisse être vue à travers le trou oval situé à la partie supérieure de l'asservissement. • Introduire un outil pour réseau () dans le trou de rége depuis la partie supérieure du mécanisme, comme illustré à la figure 10-2, puis vérifier que la vis de réseau tourne. • Appuyer séquentiellement sur les touches de piste avant TRACK FWD (▷▷) et de lecture (PLAY) (▷), et fermer les asservissements de focalisation et de moyeu. (Ne pas fermer l'asservissement de centrage de piste.) • Observer la forme d'onde à la broche 3 TRK.ERR (erreur de centrage de piste) de TP1 au moyen d'un oscilloscope. Introduire alors un filtre de coupure passe-bas 4 kHz. (Figure 10-3) Note: Si l'outil de réseau est appuyé avec force, la tête de lecture se déplace vers le centre du disque et le réglage devient difficile à effectuer. • Faire tourner un autil de réseau et rechercher le point zéro. (Photo 10-1.) • Tourner ensuite lentement dans le sens des aiguilles d'une montre l'outil de réseau depuis le point zéro et l'ajuster sur le point où la forme d'onde (signal d'erreur de centrage de piste) présente une première amplitude maximum. (Voir photo 10-3.)
Note: Si l'outil de réseau est appuyé avec force, la tête de lecture se déplace vers le centre du disque et le réglage devient difficile à effectuer. • Finalement, s'assurer que le signal d'erreur de centrage de piste (cette fois-ci le filtre de coupure passe-bas à 4 kHz n'est pas introduit) n'a pas beaucoup varié lorsque la tête de lecture est déplacée vers le centre du disque, et aussi que la tension C-C du signal de centrage de piste n'a pas non plus beaucoup varié sur la circonférence extérieure du disque. Lorsque le niveau varie de plus de ±10%, recommencer le réglage en tournant la vis de réseau jusqu'au point d'amplitude d'erreur maximum.						

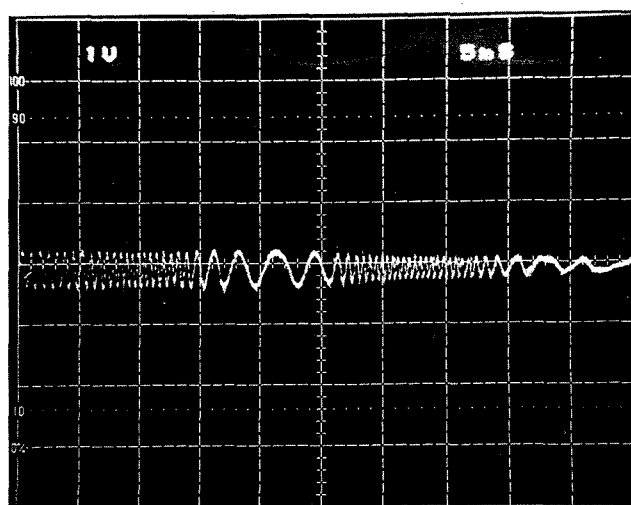


Photo 10-1 Point zéro

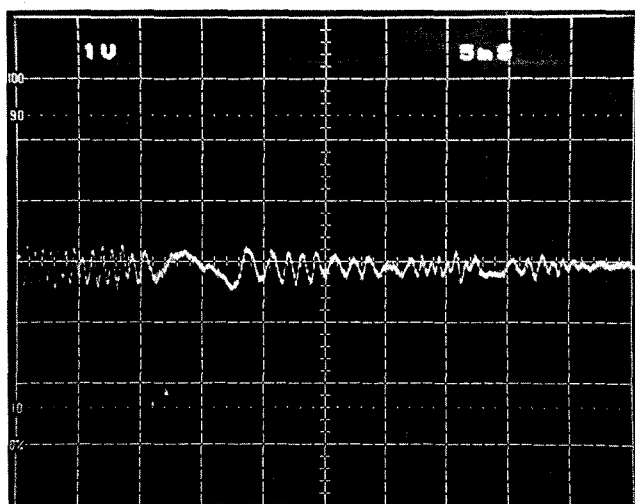


Photo 10-2 Forme d'onde hors du point zéro

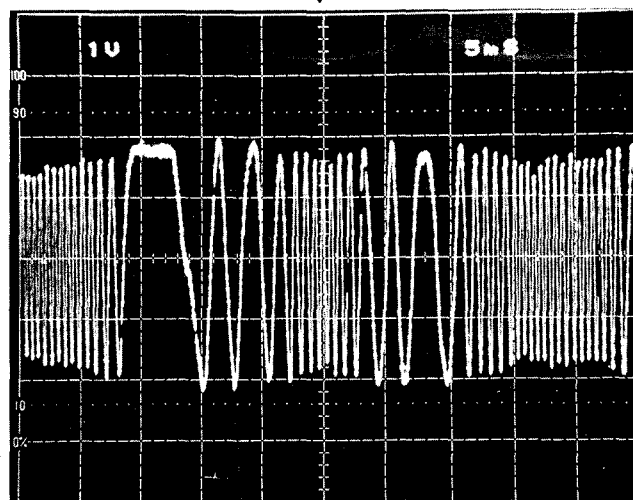
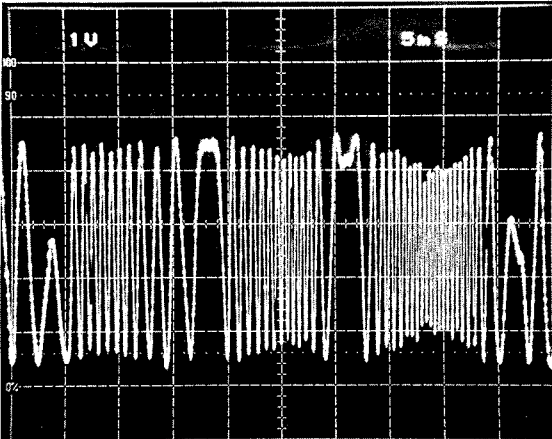
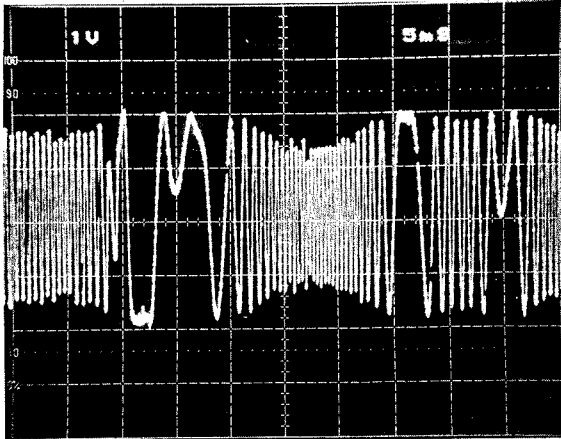


Photo 10-3 Amplitude maximum

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
5. RÉGLAGE DE L'ÉQUILIBRAGE DE CENTRAGE DE PISTE						
	0,5 V/div.	5 ms/div.	TP1 Broche 2 (TRK.ERR)	VR5 (TRK.BAL)	TRK.ERR	• Mettre en place le disque d'essai (TEST). • Régler le mode d'essai (TEST). (Voir page 53.) • Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (>>). • Appuyer sur la touche de piste avant (TRACK FWD) (>>) et sur la touche de lecture (PLAY) (>) pour faire tourner le disque. • Observer la broche 2 TRK.ERR (erreur de centrage de piste) de TP1 au moyen d'un oscilloscope et ajuster au moyen du potentiomètre VR5 TRK.BAL (équilibrage de centrage de piste) de façon à ce que la composante continue de l'erreur de centrage de piste disparaisse. Note: Prendre soin de toujours réaliser le réglage du décalage d'erreur de centrage de piste lorsque le présent réglage est effectué.
  Photo 10-4 Présence de la composante continue Photo 10-5 Absence de la composante continue						

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
6. RÉGLAGE TANGENTIEL						
		200 ns	TP1 Broche 1 (sortie RF)	Vis de réglage tangentiel	Mire Best Eye	• Mettre en place le disque d'essai (TEST) • Régler le mode d'essai (TEST). (Voir page 53.) • Amener la tête de lecture à proximité du centre du disque en appuyant sur la touche de recherche manuelle avant (MANUAL SEARCH FWD) (>>). • Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) (>>>), de lecture (PLAY) (>) et de pause (PAUSE) (■), et fermer tous les asservissements. (Le voyant de pause s'allume.) • Observer le signal RF à la broche 1 (sortie RF) de TP1 au moyen d'un oscilloscope et régler au moyen de la vis tangentielle, de façon à ce que la mire Best Eye devienne claire. (Figure 10-4) • Le point de réglage se situe au milieu entre le point où la mire se détériore en tournant la vis tangentielle dans le sens des aiguilles d'une montre et le point où la mire se détériore en tournant la vis tangentielle dans le sens inverse des aiguilles d'une montre. Comme critère, observer que la forme d'onde globale soit claire et que l'une des formes de losange se situe dans la mire (Photo 10-6); réaliser le réglage en un point optimum où la forme de losange apparaît avec des traits relativement fins.

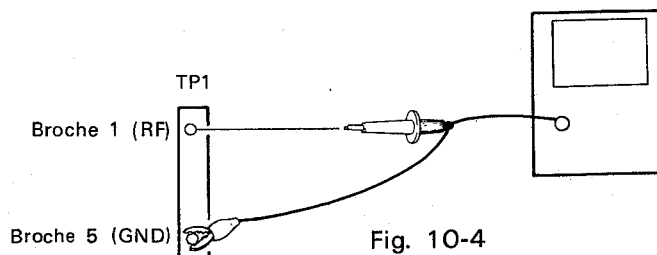
TP1

Broche 1 (RF)

Broche 5 (GND)

Fig. 10-4

Note: Pendant le réglage, tenir la clex six-pans vers le haut de façon à ce que le corps de la tête de lecture ne descende pas.



Note: Pendant le réglage, tenir la clef six-pans vers le haut de façon à ce que le corps de la tête de lecture ne descende pas.

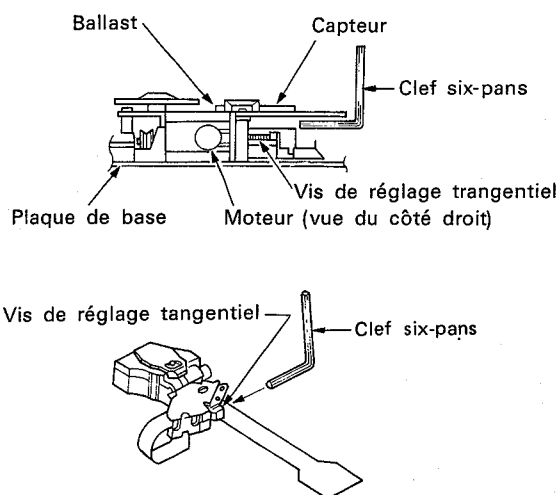


Fig. 10-5 Réglage tangentiel

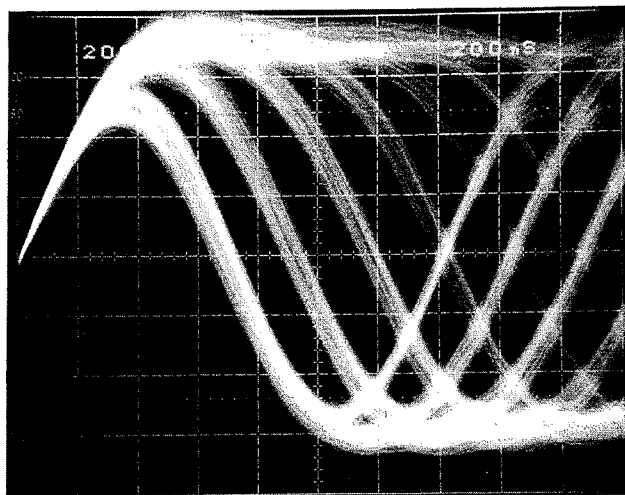
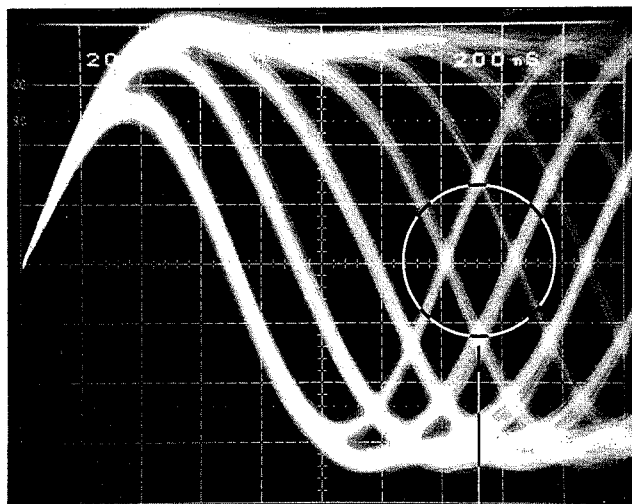


Photo 10-7



Partie à observer

Photo 10-8

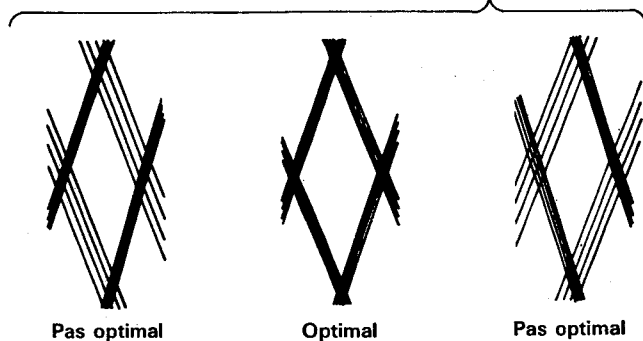


Photo 10-6

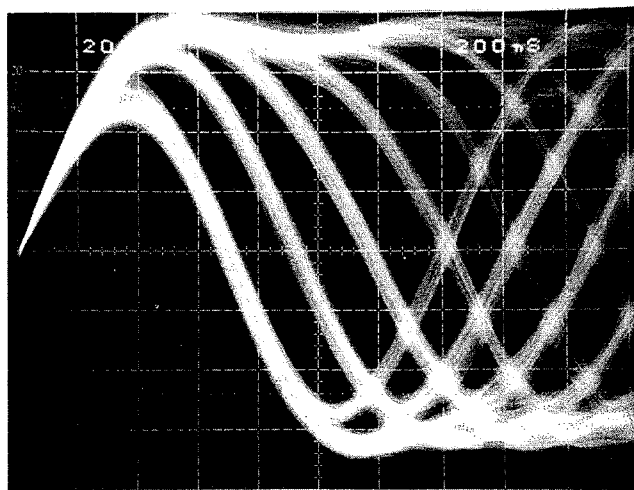


Photo 10-9

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
7. CONTRÔLE DU NIVEAU RF						
			TP1 Broche 1 (RF)	VR1 Puissance laser	2.0 Vc-c ±0.6 Vc-c	• Régler le mode d'essai (TEST). (Voir page 53.) • Reproduire le disque d'essai (TEST) et raccorder la sonde d'un oscilloscope à la broche 1 RF (sortie RF) de TP1 et mesurer la tension C-C de la forme d'onde RF. • Vérifier que la tension est de 2,0V±0,6 Vcc. • Si la tension est supérieure à 2,6 Vcc, la régler dans la plage spécifiée.
8. RÉGLAGE DU GAIN DE FOCALISATION						
	20 mV/div. 5 mV/div. Canal 1(X), Canal 2(Y) (Sonde 10:1)	Axe X TP1 Broche 5 (FCS.IN) Axe Y TP1 Broche 6 (FCS.ERR)	VR3 (FCS.GAIN)	Différence de phase 90°.	• L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 10-6. • Régler le mode d'essai (TEST). (Voir page 53.) • Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) (▷▷), de lecture (PLAY) (▷) et de pause (PAUSE) (■), puis enclencher chaque asservissement de focalisation, moyeu et centrage de piste. • Enclencher l'alimentation de l'oscillateur et délivrer un signal de 1,2 kHz à 1 Vc-c. Note: (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.) • Ajuster le potentiomètre VR3 FCS.GAN (gain de focalisation) de façon à ce que la figure de Lissajou observée sur l'oscilloscope devienne un cercle horizontal (déphasage 90°).	

Fig. 10-6

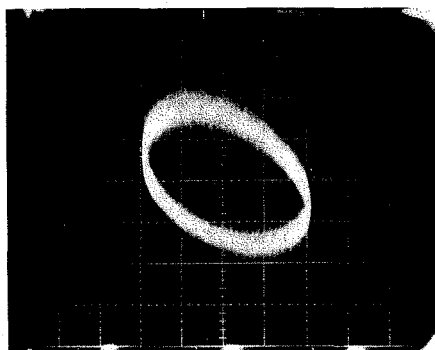
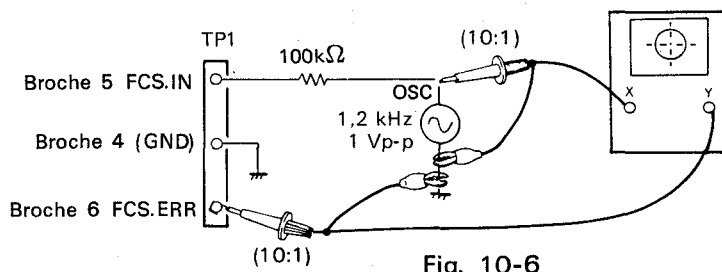


Photo 10-10 Gain élevé

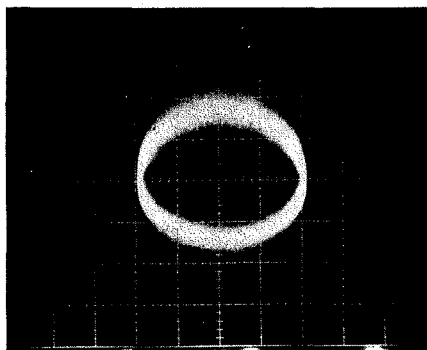


Photo 10-11 Gain optimum

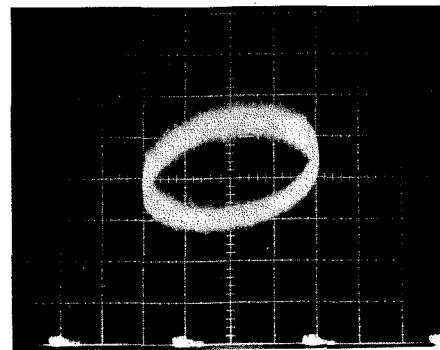
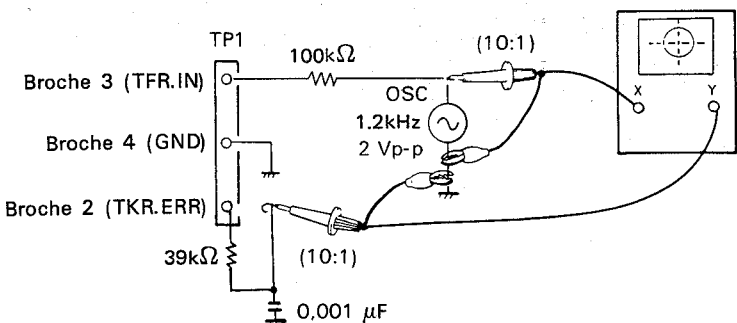


Photo 10-12 Gain réduit

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/spécifications de réglage	Méthode de réglage
	V	H				
9. RÉGLAGE DU GAIN DE CENTRAGE DE PISTE						
	50 mV/div. 5 mV/div. Canal 1 (X), Canal 2 (Y) (Sonde 10:1)	Axe X TP1 Broche 3 (TRK.IN) Axe Y TP1 Broche 2 (TRK.ERR)	VR4 (TRK.GAN)	Déphasage 90°	• L'alimentation étant coupée (POWER OFF), raccorder un oscilloscope et un oscillateur de la manière indiquée à la figure 10-7. • Régler le mode d'essai (TEST). (Voir page 53.) • Appuyer séquentiellement sur les touches d'avance de piste (TRACK FWD) (▷), de lecture (PLAY) (▷) et de pause (PAUSE) (▢), puis enclencher chaque asservissement de focalisation, moyeu et centrage de piste. Enclencher l'alimentation de l'oscillateur et fournir un signal de 1,2 kHz à 2 Vc-c. Note: (En fonction de l'oscillateur utilisé, certains appareils fournissent un courant continu lors de leur enclenchement. Par conséquent, il est préférable de raccorder l'oscillateur après avoir enclenché son alimentation.) • Ajuster le potentiomètre VR4 TRK GAN (gain de centrage de piste) de façon à ce que la figure de Lissajou sur l'oscilloscope devienne un cercle horizontal (déphasage 90°).	
 Fig. 10-7						

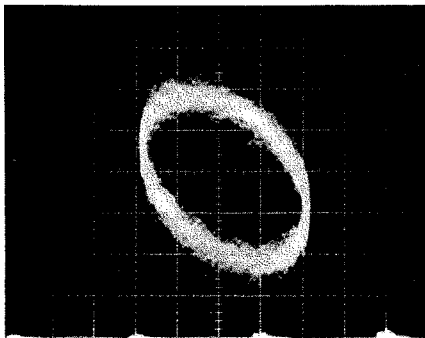


Photo 10-13 Gain élevé

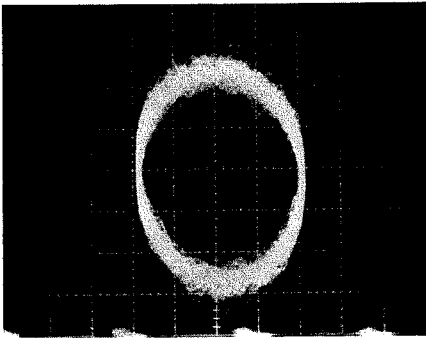


Photo 10-14 Gain optimum

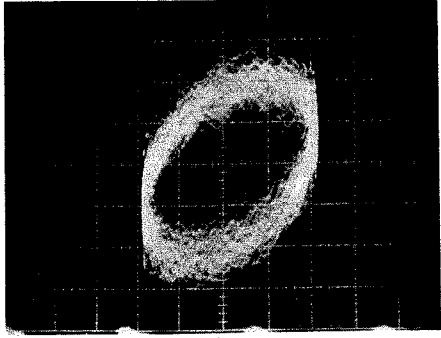
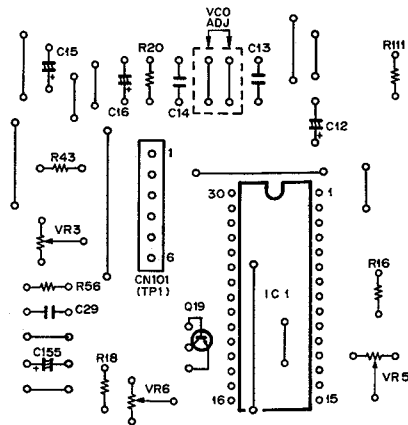


Photo 10-15 Gain réduit

Pas No.	Réglage de l'oscilloscope		Points d'essai	Points de réglage	Points de contrôle/ spécifications de réglage	Méthode de réglage
	V	H				
10. RÉGLAGE DE LA FRÉQUENCE PROPRE DU VCO						
			TP2 Broche 2	VR8 (VCO.ADJ)	4,375 ±0,025 MHz	• Régler le mode d'essai (TEST). (Voir page 53.) • Court-circuiter entre les ponts ASY et GND au moyen de l'outil de réseau, etc. (Figure 10-8) • Raccorder un fréquencemètre capable de mesurer au-dessus de 10 MHz à la broche 2 de TP2. • Ajuster le potentiomètre VR8 VCO ADJ (réglage du VCO) de façon à ce que la valeur indiquée par le fréquencemètre devienne égale à 4,375±0,025 MHz.  Fig. 10-8
11. MÉTHODE DE CONTRÔLE DE LA CARACTÉRISTIQUE S (ERREUR DE FOCALISATION)						
						• Régler le mode d'essai (TEST). (Voir page 53.) • Réaliser un court-circuit entre la broche 6 FCS.IN (entrée de focalisation) de TP1 et la terre GND. • Appuyer sur la touche d'avance de piste (TRACK FWD) (▶) et observer simultanément la forme d'onde à la broche 7 FCS.ERR (erreur de focalisation) de TP1 au moyen d'un oscilloscope.

10. AJUSTES

Los items de ajuste de este modelo deberán ser efectuados en el orden mostrado abajo.

• Items de ajuste

1. Ajuste de compensación de error de seguimiento, foco y RF.
2. Confirmación de la alimentación de salida de LD (diodo laser)
3. Confirmación de enclavamiento del enfoque y del eje
4. Ajuste del retículo
5. Ajuste del equilibrio de seguimiento
6. Ajuste tangencial
7. Confirmación del nivel de RF
8. Ajuste de la ganancia de enfoque
9. Ajuste de la ganancia de seguimiento
10. Ajuste de la frecuencia propia de VCO

• Equipo de medición

1. Osciloscopio de doble traza
2. Medidor de alimentación del laser
3. Disco de prueba (YEDS7)
4. Filtro de ajuste de equilibrio de seguimiento
5. Filtro de ajuste de ganancia de bucle
6. Generador de señal
7. Contador de frecuencia
8. Otras herramientas generales

• Modo de prueba

Todos los ajustes deberán ser ejecutados en el modo de prueba.

Ajuste del modo de prueba y los procedimientos de cancelación

- (1) Para disponer el modo de prueba, coloque en ON el interruptor POWER del reproductor (SW101) mientras presiona el interruptor TEST MODE. (terminales del modo de ajuste).
- (2) Para cancelar el modo de prueba, simplemente gire el interruptor de POWER del reproductor a OFF.

Las varias funciones de tecla en el modo de prueba están enlistadas en la Tabla 10-1.

• Puntos de ajuste

- VR1: Alimentación del laser
 VR7: Desviación del seguimiento (TRK.OFS)
 VR3: Ganancia de enfoque (FCS.GAN)
 VR4: Ganancia de seguimiento (TRK.GAN)
 VR5: Equilibrio de seguimiento (TRK.BAL)
 VR6: Desviación de enfoque (FCS.OFS)
 VR8: Ajuste de VCO
 VR2: Compensación de RF (RF.OFS)

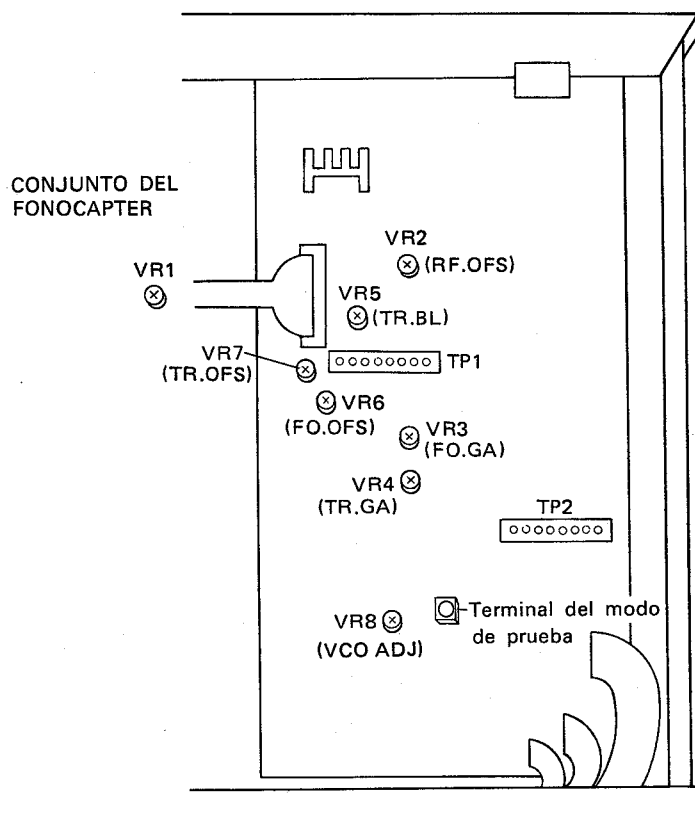


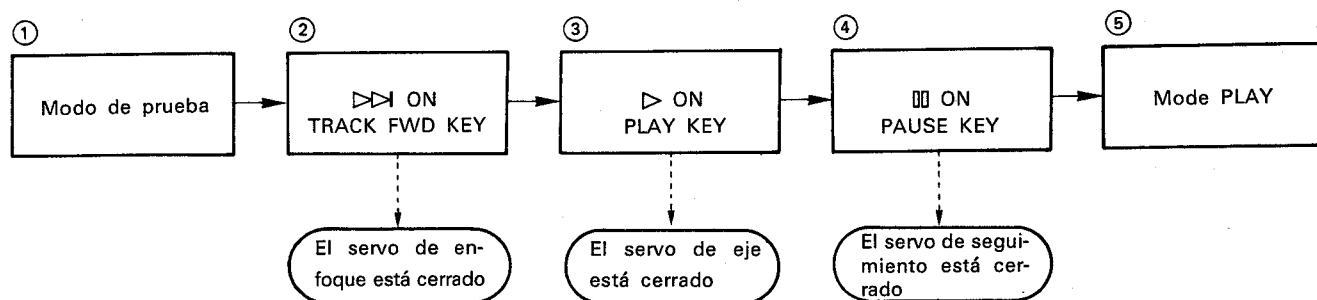
Fig. 10-1 Punto de ajuste

En el modo de prueba, cada servocircuito puede ser cerrado y abierto por operaciones separadas. Consecuentemente, cada servo deberá ser cerrado uno a la vez (en secuencia en serie) para ajustar el modo de PLAY (reproducción).

Fijese que el modo de PLAY no se activa simplemente presionando la tecla de PAUSE (pausa) () en el modo de prueba.

Ejemplo: Conmutando del modo de STOP (parado) a PLAY.

* Cada servomecanismo funciona en una secuencia en serie en el modo de prueba.

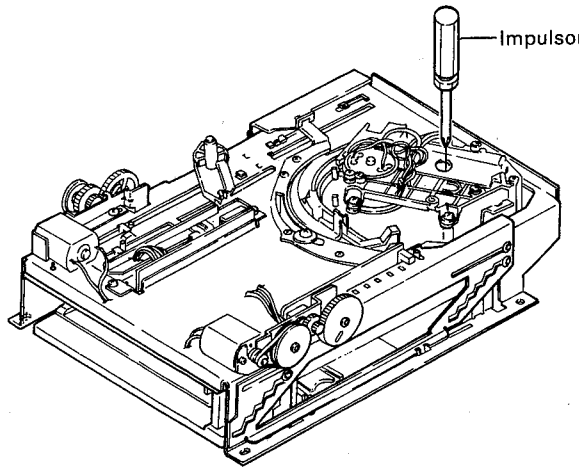
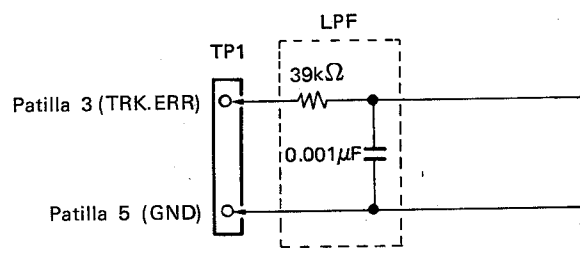


• Funciones de tecla en el modo de prueba

Símbolo	Nombre de tecla	Función durante el modo de prueba	Descripción
	TRACK BACK	El diodo de laser está encendido ON.	El diodo laser se enciende.
	TRACK FWD	El servo de enfoque está cerrado.	El diodo laser se enciende. El actuador se mueve arriba/abajo, luego se cierra el servo de enfoque.
	PLAY	El servo de eje está cerrado.	El eje comienza a rotar y se cierra el servo cuando se convierte en el modo de servo CLV-A.
	PAUSE	El servo de seguimiento está cerrado/abierto	Ejecuta la operación de conexión oscilante. Cuando se cierra el servo de seguimiento y se pone en el modo de PLAY presionando esta tecla (el servo de enfoque y el del eje deberán estar cerrados), y el indicador de pausa se enciende. El servo de seguimiento se abre presionando de nuevo la tecla.
	MANUAL SEARCH REV	El carro se mueve en la dirección inversa (hacia el centro del disco)	El carro se mueve hacia el centro del disco a una alta velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
	MANUAL SEARCH FWD	El carro se mueve en la dirección hacia delante. (hacia el final del disco)	El carro se mueve hacia el final del disco a una alta velocidad de como 3 cm/seg. Ya que no existe un mecanismo de seguridad para detener el carro, libere la tecla cuando el carro llegue al final.
	STOP	PARADO	Todos los servos están abiertos.
	OPEN/CLOSE	(bandeja de disco) ABIERTO/CERRADO	La bandeja de disco se abre y se cierra. Sin embargo, el captador no regresa a su posición de aparcamiento. Además, aun cuando se cierra el disco el captador permanece tal como está.

Tabla 10-1

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
1	AJUSTES DE COMPENSATION DE ERROR DE SEGUIMIENTO, FOCO Y RF					
			PATILLA 2 DE TP1 (TRK.ERR) TP1 VR6 Compens. de foco Esp. 6 (FCS.OFS) 0V ±50mV (FCS.ERR)	VR5 (TRK.BAL) VR7 (TRK.OFS) TP1 VR2 Compens. de RF Esp. 1 (RF.OFS) 100 mV ± 50 mV (RF.OUTPUT)	45° 0V±50 mV	- Ajuste el modo de prueba. (vea la página 64.) - Gire el volumen de TRK.BAL (Equilibrio de seguimiento) de VR5 en el sentido de las manecillas del reloj 45°del centro. - Ajuste con el volumen de TRK.ERR (Error de seguimiento) de VR7 de modo que el voltaje en TRK.ERR (Error de seguimiento) de la patilla 3 de TP1 se ponga eb 0V±50 mV. - Ajuste VR6 FCS.OFS (compensación de foco) de modo que el voltaje de FCS.ERR (error de foco) en la espiga 6 de TP1 sea 0V ± 50 mV. - Ajuste VR2 RF.OFS (compensación de RF) de modo que el voltaje de salida de RF en la espiga 1 de TP1 sea 100 mV ± 50 mV.
2	CONFIRMACION DE ALIMENTACION DE ALIDA DE LD (DIODO LASER)					
				VR1	Especificación: 0,13 mW±0,01 mW	- Ajuste el modo de prueba. (vea la página 64.) - Presione la tecla de TRACK BACK (⏮) y encienda el LD (Diodo laser). - Ubique el sensor del medidor de potencia del laser inmediatamente arriba del objetivo, y confirme que la potencia de salida del LD sea 0,13 mW±0,01 mW. - Si la potencia estuviera fuera del margen especificado, ajústela con el resistor variable LD OUTPUT POWER ADJ VR1.
3	CONFIRMACION DE BLOQUEO DE ENFOQUE Y DEL EJE					
	V 0,5V/div	H 100 mseg/div	Patilla 1 de TP1 (Salida de RF)		Existe salida de RF Rotación normal	- Ajuste del disco de TEST. - Ajuste del mode de TEST. (Vea la página 64.) - Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (⏭). * Tenga en cuenta que este paso deberá ser ejecutado. - Observe RF (Radio frecuencia) de la patilla 1 de TP1 con un osciloscopio y confirme que se saque la señal de RF después de presionar la tecla de TRACK.ERR (⏭). - Presione la tecla de PLAY (▶) y asegúrese que el disco rota en la dirección normal casi a la velocidad especificada (tal como está cerca del centro del disco, la velocidad de rotación es alrededor de 30 rpm) y que no rote anormalmente o inversamente.

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
4	AJUSTE DE LA MIRA					
	 Fig. 10-2  Fig. 10-3					• Ajuste el mode TEST. (Vea la página 64.) • Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷▷) de modo que el tornillo de ajuste de retículo del captador pueda ser visto a través del orificio oval en el lado superior del servomecanismo. • Inserte un impulsor de retículo () en el orificio del lado superior del mecanismo como se muestra en la Fig. 10-2, y confirm que gira el tornillo de retículo. • Presione la tecla de TRACK FWD (▷▷) y la tecla de PLAY (▷) secuencialmente y cierre el servo de enfoque y el del eje. (No cierre el servo de seguimiento.) • Observe la forma de onda en TRCK.ERR (Error de seguimiento) de la patilla 3 de TP1 con un osciloscopio. Luego inserte un filtro de paso bajo de corte. (Fig. 10-3)
0,5V/div	5 ms/div	TRK.ERR de la patilla 2 de TP1	Retículo	Punto cero	Amplitud máxima	• Gire el impulsor de reticulo y encuentre el punto cero (Foto. 10-1) • Luego, gire lentamente el impulsor de retículo en la dirección de las manecillas del reloj desde el punto cero y ajuste en el punto donde la forma de onda (Señal de error de seguimiento) primeramente se ponga a una amplitud máxima. (Vea Foto 10-3) Nota: Si el impulsor de retículo se presiona fuertemente, el captador se mueve hacia el centro del disco, por consiguiente el ajuste resulta difícil. • Finalmente, asegúrese de confirmar que la señal de error de seguimiento (en este momento, no se ha insertado el filtro de paso bajo de corte de 4 kHz) cuando el captador se mueve hacia el centro del disco y el voltaje de P-P do la señal de error de seguimiento en la circunferencia exterior del disco no haya variado considerablemente. Cuando se desvía el nival arriba de ±10%, ajuste de nuevo girando el tornillo de retículo a un punto de amplitud de error mínimo.

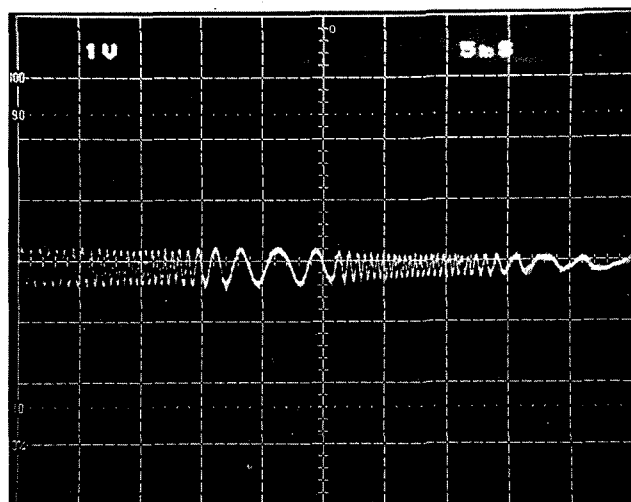


Foto. 10-1. Punto cero

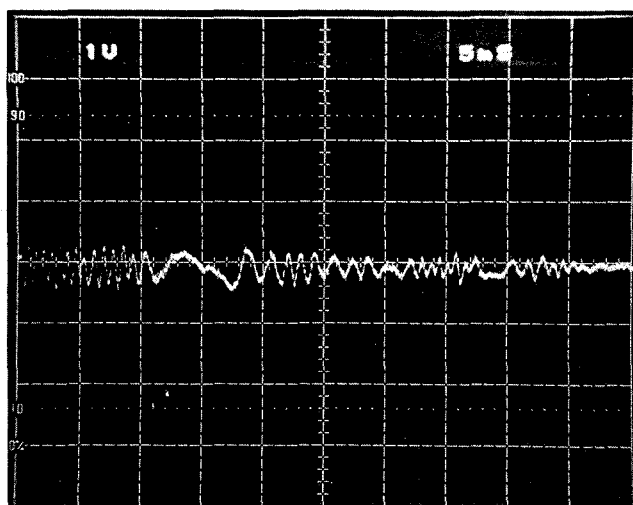


Foto. 10-2. Forma de onda de un punto no cero

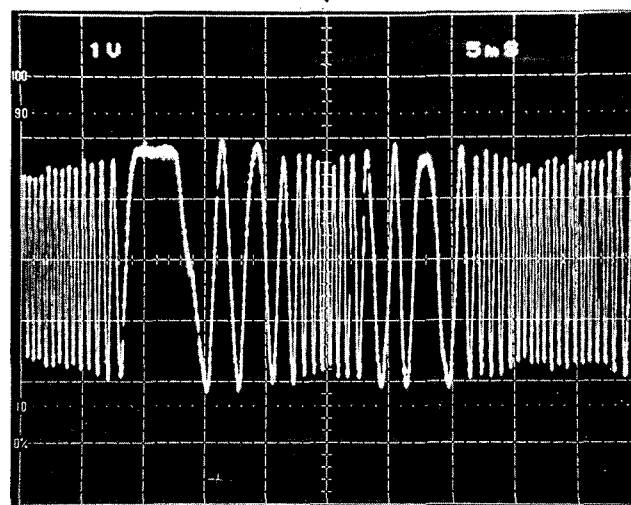
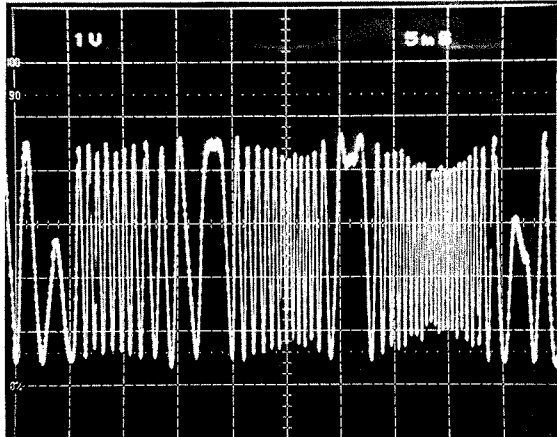
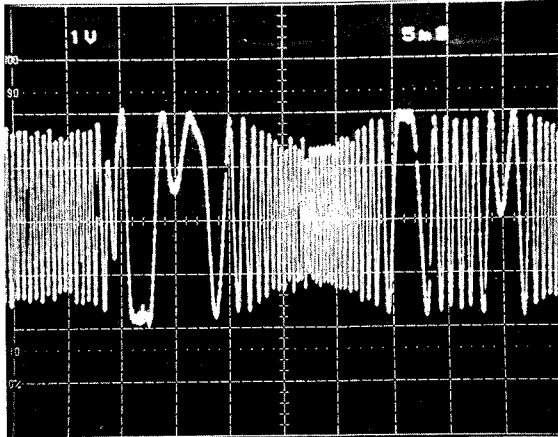


Foto. 10-3 Amplitud máxima

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
5 AJUSTE DE EQUILIBRIO DE SEGUIMIENTO						
	0,5/div	5 mseg /div	Patilla 2 de TP1 (TRK.ERR)	VR5 (TRK.BAL)	TRK.ERR	• Ajuste el disco de TEST. • Ajuste el mode de TEST. (Vea la página 64.) • Cambie el captador cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD (▷). • Presione la tecla de TRACK FWD (▷) y la tecla de PLAY (▷) para comenzar a voltear el disco. • Observe TRK.ERR (Error de seguimiento) de la patilla 2 de TP1 con un osciloscopio y ajuste con el volumen de TRK.BAL (Equilibrio de seguimiento) de VR5 de modo que la componente de CC del error de seguimiento desaparezca. Nota: Cuando se ejecuta este ajuste, asegúrese de siempre ejecutar el ajuste de desviación de error de seguimiento.
 						
Foto. 10-4 Existe componente de CC Foto. 10-5 No existe componente de CC						

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
6 AJUSTE TANGENCIAL						
		200 nS	Patilla 1 de TP1 (Salida de RF)	Tornillo de ajuste de la tangencial	Mejor imagen de prueba	• Ajuste el disco de TEST. • Ajuste el mode de TEST. (Vea la página 64.) • Cambie el carro cerca del centro del disco presionando la tecla de MANUAL SEARCH FWD ($\gg$). • Presione la tecla de TRAK FWD ($\gg$), la tecla de PLAY ($\triangleright$) y la tecla de PAUSE ($\square$) secuencialmente, y cierre todos los servos. (El indicador de pausa se enciende.) • Observe el RF de la patilla 1 (Salida de RF) de TP1 con un osciloscopio y ajuste con el tornillo de la tangencial de modo que la imagen de prueba resulte nítida. (Fig. 10-4) • El punto de ajuste es el punto medio entre el punto donde la imagen de prueba se deteriora girando el tornillo de la tangencial en el sentido de las manecillas del reloj, y el punto donde la imagen de prueba se deteriora girando el tornillo de la tangencial en contra del sentido de las manecillas del reloj. Como un criterio, observe que la forma de onda en conjunto sea nítida y que una de las figuras de diamante esté dentro de la imagen de prueba (Foto. 10-6), y ajuste al punto óptimo donde la forma de diamante se vea relativamente como una línea fina.

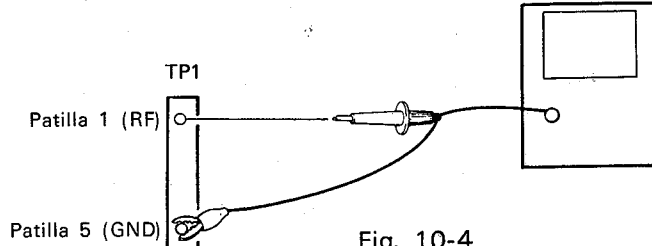


Fig. 10-4

(Nota) Durante el ajuste, sostenga la llave hexagonal hacia arriba para mantener el cuerpo del captador de no ir hacia abajo.

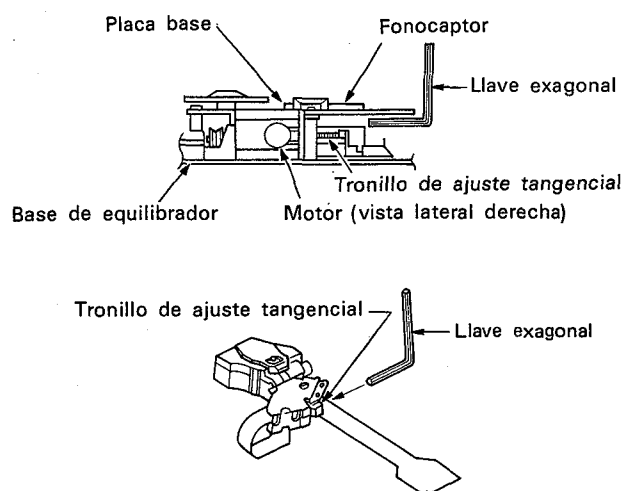


Fig. 10-5 Ajuste tangencial

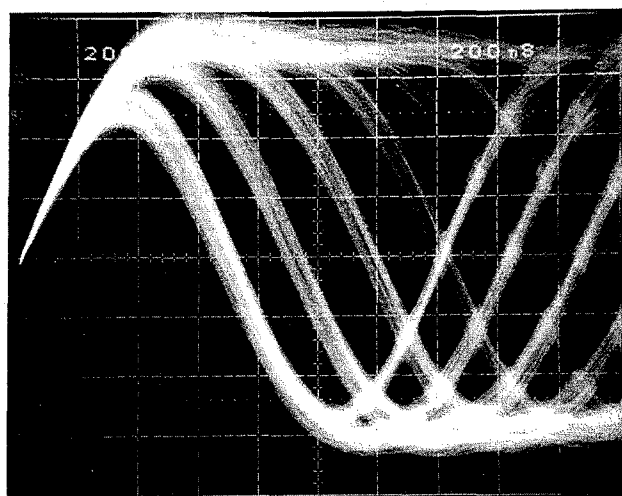
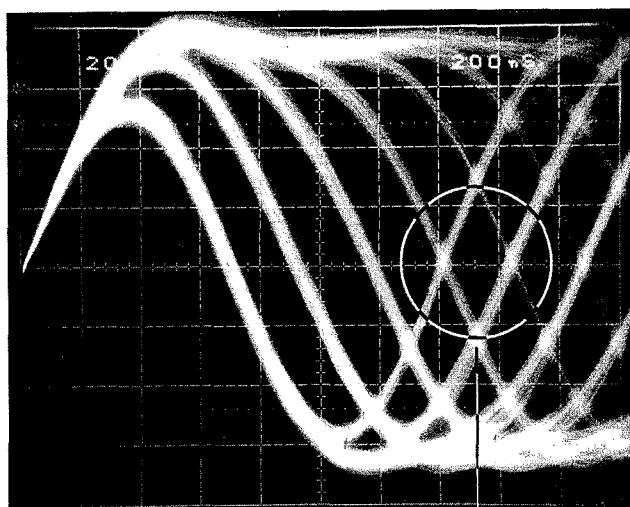


Foto. 10-7



Parte a ser observada

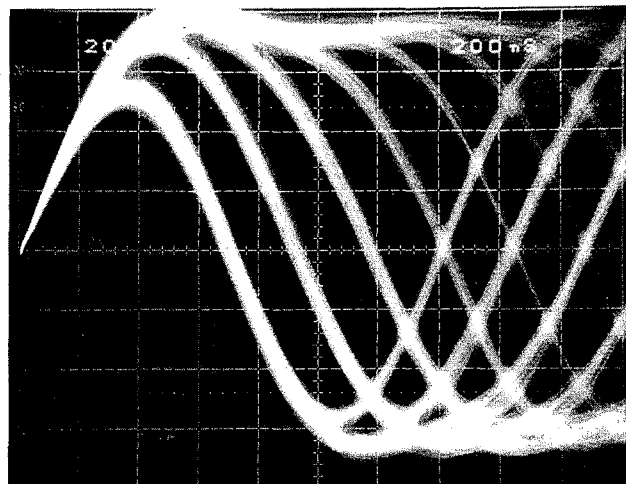


Foto. 10-8

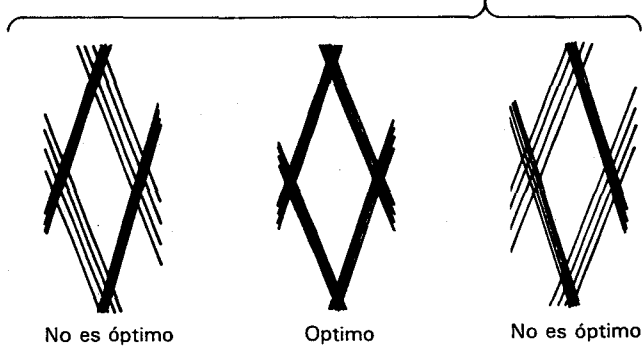


Foto. 10-6

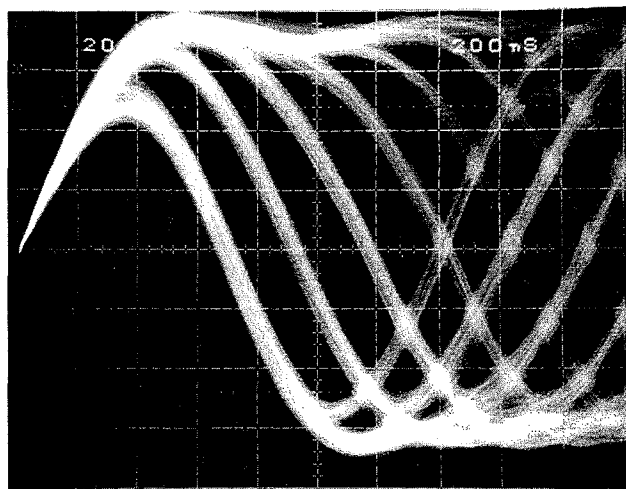


Foto. 10-9

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
7	CONFIRMACION DEL NIVEL DE RF					
			Patilla 1 de TP1 (RF)	Alimentación del laser VR1	2.0 Vp-p ±0.6 Vp-p	• Ajuste el mode de TEST. (Vea la página 64.) • Reproduzca el disco de TEST y conecte la sonda de un osciloscopio a la RF de la patilla 1 (Salida de RF) de TP1 y mida el voltaje de P-P de la forma de onda de RF. • Confirme que el valor sea 2,0V±0,6 Vp-p. • En caso de que esté por encima de 2,6 Vp-p, ajústelo al margen especificado.
8	AJUSTE DE GANANCIA DE ENFOQUE					
	20 mV/div.5/mV/div. CH1 (X), CH2 (Y) (SONDA 10:1)	Eje X Patilla 5 de TP1 (FCS.IN) Eje Y Patilla 6 de TP1 (FCS.ERR)	VR3 (GANACIA FCS)	Diferencia de fase 90°	• En el estado de POWER OFF (apagado), conecte el osciloscopio y el oscilador como se muestra en la Fig. 10-6. • Ajuste el mode de TEST. (Vea la página 64.) • Presione la tecla de TRACK FWD (), la tecla de PLAY () y la tecla de PAUSE () secuencialmente, y encienda el servo de enfoque, el del eje y el de seguimiento. • Encienda el oscilador y extraiga 1,2 kHz 1 Vp-p. Nota: (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por lo tanto, es conveniente conectar el oscilador después del encendido.) • Ajuste con el volumen de FCS.GAN (Ganancia de enfoque) de VR3 de modo que la figura de Lissajous del osciloscopio a ser un círculo horizontal (90° de diferencia de fase).	

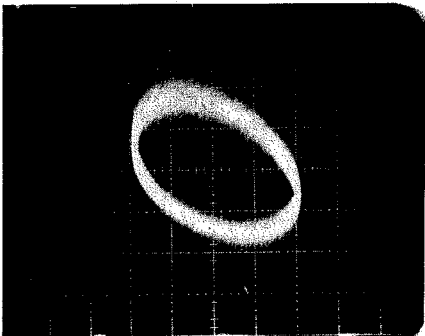


Foto. 10-10 Alta ganancia

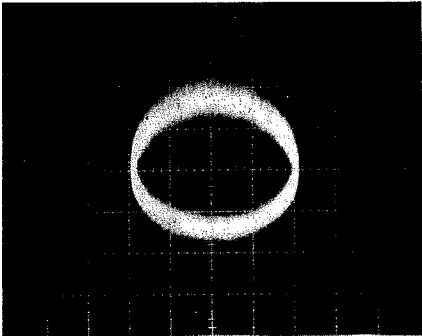


Foto. 10-11 Ganacia óptima

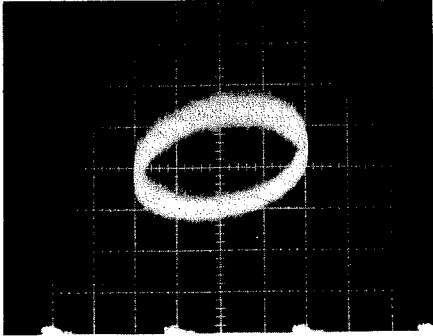
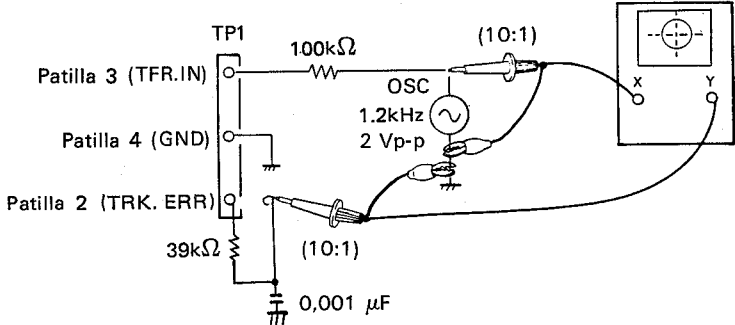


Foto. 10-12 Baja ganancia

No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
9	AJUSTE DE GANANCIA DE SEGUIMIENTO					
	50 mV/div. 5 mV/div. CN1 (X), CH2 (Y) (SONDA 10:1)	Eje X Patilla 3 de TP1 (TRK.ERR) Eje Y Patilla 2 de TP1 (TRK.ERR)	VR4 (TRK.GAN)	90° de diferencia	- En el estado de POWER OFF (apagado), conecte un osciloscopio y un oscilador como se muestra en la Fig. 10-7. - Ajuste el mode de TEST. (Vea la página 64.) - Presione la tecla de TRACK FWD (▶▶), la tecla de PLAY (▶), y la tecla de PAUSE (⏏) secuencialmente, y encienda el servo del enfoque, el del eje y el de seguimiento. - Encienda el oscilador y extraiga 1,2 kHz 1 Vp-p. Nota: (Dependiendo en los osciladores, algunos de ellos producen CC cuando son encendidos. Por la tanto, es conveniente conectar el oscilador después del encendido.) - Ajuste con el volumen de TRAK GAN de VR4 (Ganancia de seguimiento) de modo que la figura de Lissajous del osciloscopio llegue a ser un círculo horizontal (90° de diferencia de fase).	

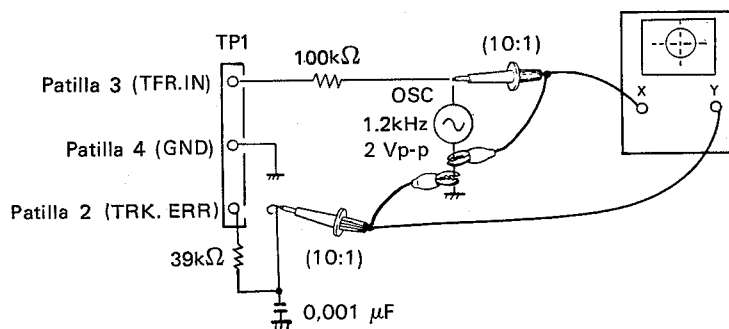


Fig. 10-7

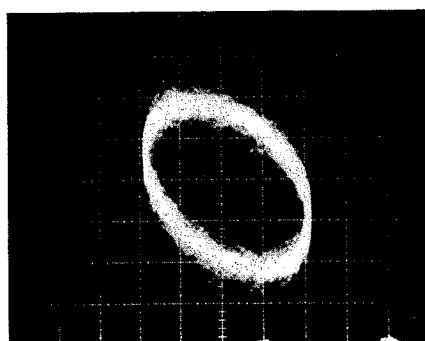


Foto. 10-13 Alta ganancia

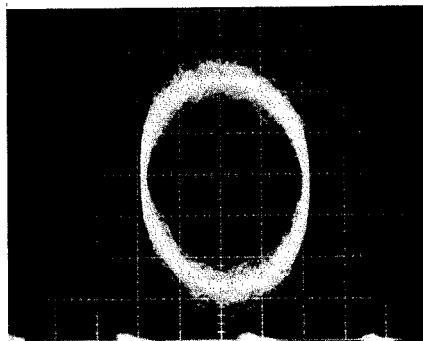


Foto. 10-14 Ganancia óptima

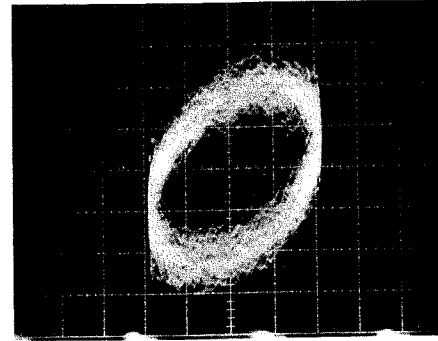


Foto. 10-15 Baja ganancia

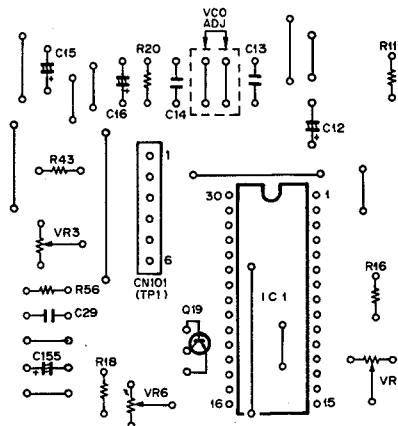
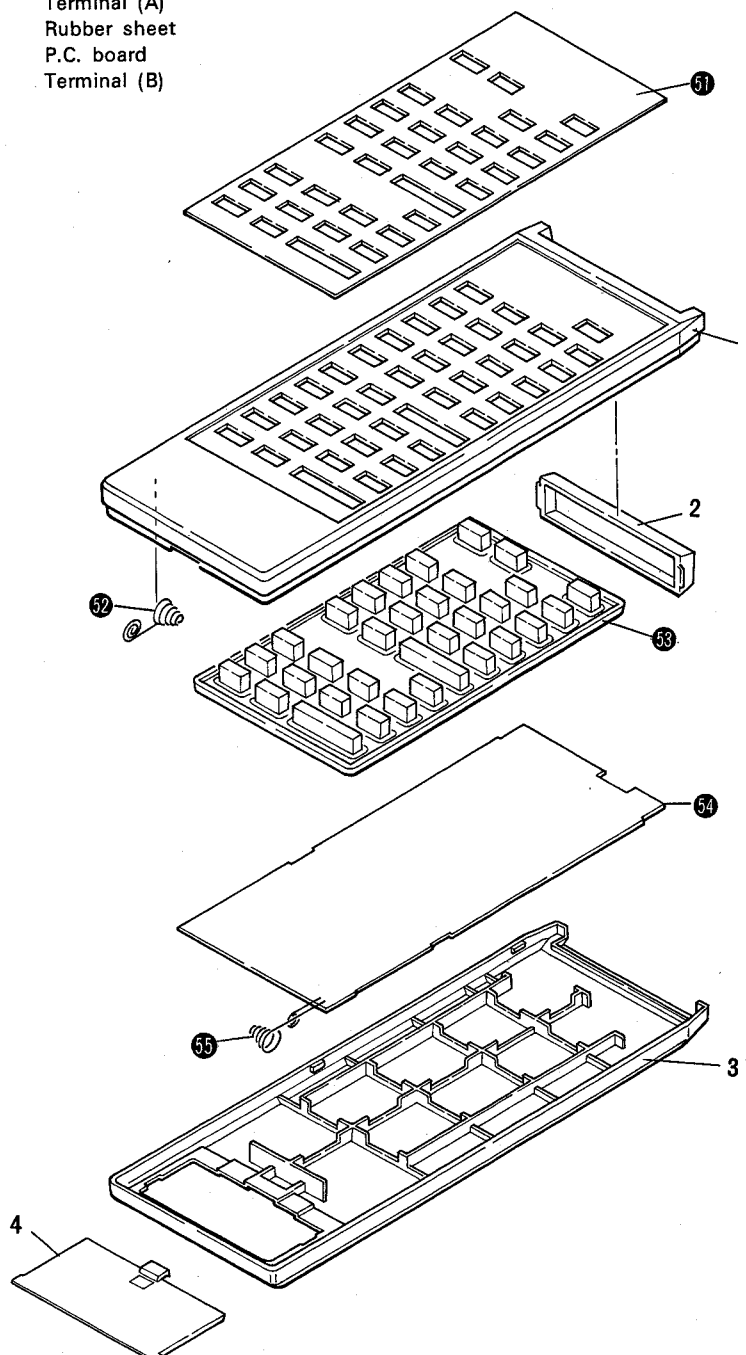
No. de paso	Ajuste del osciloscopio		Puntos de prueba	Puntos de ajuste	Items de verificación/ Especificaciones de ajuste	Procedimiento de ajuste
	V	H				
10 AJUSTE DE LA FRECUENCIA PROPIA DE VCO						
			Patilla 2 de TP2	VR8 (VCO.ADJ)	4,375±0,025 MHz	• Ajuste el mode de TEST. (Vea la página 64.) • Haga un cortocircuito entre ASY y la conexión volante de GND con impulsor de retículo, etc. (Fig. 10-8) • Conecte el frecuencímetro, que pueda medir arriba de 10 MHz, a la patilla 2 de TP2. • Ajuste con el volumen VCO ADJ (ajuste de VCO) de VR8 de modo que el valor del frecuencímetro se ponga en 4,375±0,025 MHz.
 Fig. 10-8						
11 METODO PARA CONFIRMAR EL CARACTER S (ERROR DE ENFOQUE)						
						• Ajuste el mode de TEST. (Vea la página 64.) • Haga un cortocircuito entre FCS.IN (Entrada de enfoque) de la patilla 6 de TP1 y GND. • Presione la tecla de TRACK FWD (▶▶) y observe la forma de onda de FCS.ERR (Error de enfoque) de la patilla 7 de TP1 con un osciloscopio.

Fig. 10-8

11. REMOTE CONTROL UNIT (PWW1008)

Parts List of Remote Control Unit

Mark	No.	Part No.	Description
	1	PNW1151	Case (A)
	2	PAM1071	Filter
	3	PNW1152	Case (B)
	4	PNW1153	Cover
	51		Aluminum plate
	52		Terminal (A)
	53		Rubber sheet
	54		P.C. board
	55		Terminal (B)



12. FOR KC, HEM, HB, SD, AND SD/G TYPES

NOTES:

- Parts without part number cannot be supplied.
 - Parts marked by "●" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
 - The ▲ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
 - For your parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.
- ★★ GENERALLY MOVES FASTER THAN ★
This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

CONTRAST OF MISCELLANEOUS PARTS

The PD-M50/KC, HEM, HB, SD and SD/G types are the same as the PD-M50/KU type with the exception of the following sections.

Mark	Symbol & Description	Part No.						Remarks
		KU	KC	HEM	HB	SD	SD/G	
▲ ●	Main board assembly	PWZ1159	PWZ1159	PWZ1223	PWZ1223	PWZ1229	PWZ1229	
●	Control board assembly*	PWZ1160	PWZ1160	PWZ1224	PWZ1224	PWZ1230	PWZ1230	
▲	Transformer board assembly							
▲	AC power cord	PDG1002	PDG1002	PDG1003	PDG1004	PDG1013	PDG1013	
▲	Strain relief	CM-22C	CM-22C	CM-22B	CM-22B	CM-22B	CM-22B	
▲ ★★	S1 Voltage selector (AC110/120-127/220/240V)	.....	.....	.....	.....	PSB1002	PSB1002	
	Packing case	PHG1080	PHG1091	PHG1091	PHG1091	PHG1091	PHG1091	
	Single magazine assembly	PXA1043	PXA1043	.....	.....	PXA1043	PXA1043	
	Operating instructions (English)	PRB1022	.....	.....	PRB1022	PRB1022	PRB1022	
	(English/French)	.....	PRE1021	PRE1021	.....	.....	.....	
	(German/Italian)	.....	.....	PRF1002	.....	.....	.....	
	(Spanish)	.....	.....	.....	.....	PRC1005	.....	

* Marked P.C. board assemblies:

Regard less differences on parts numbers, the P.C. board assemblies for the additional types are identical with the KU type.

MAIN BOARD ASSEMBLY (PWZ1223)

The main board assembly (PWZ1223) is the same as the main board assembly (PWZ1159) with the exception of the following sections.

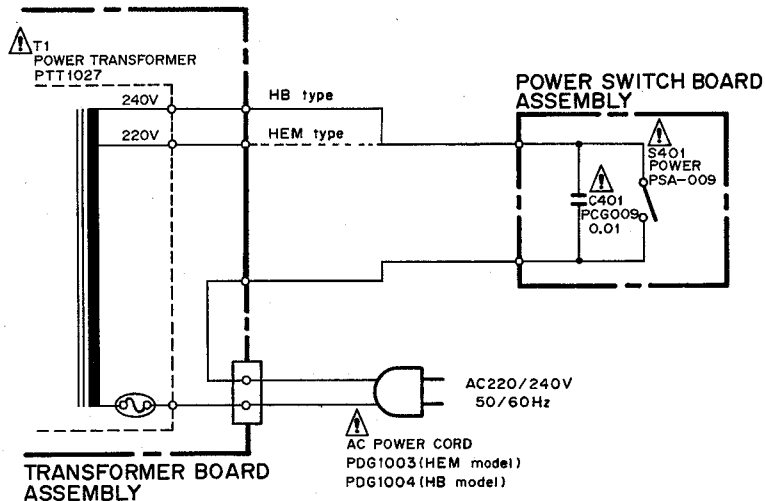
Mark	Symbol & Description	Part No.		Remarks
		PWZ1159	PWZ1223	
	C5, C20 (330/16)	CEAS331M16	.....	
	(220/25)	.....	PCH1056	
	C12, C15 (33/35)	CEAS330M35	.....	
	(220/50)	.....	PCH1045	
	C69, C70	CQMA104K50	CFTXA104J50	
	C100 (2200/25)	CEAS222M25	.....	
	(220/50)	.....	PCH1043	
	C102 (1000/16)	CEAS102M16	.....	
	(220/50)	.....	PCH1004	
	C150—C153	CQMA104K50	CFTXA104J50	
★★	IC11	NJM78M05FA	NJM7805FA	
★★	IC12	NJM79M05FA	NJM7905FA	

TRANSFORMER BOARD ASSEMBLY

The transformer board assembly (for KC, HEM, HB, SD and SD/G types) are the same as the transformer board assembly (for KU type) with the exception of the following sections:

Mark	Symbol & Description	Part No.						Remarks
		KU	KC	HEM	HB	SD	SD/G	
⚠ ★	T1 Power transformer (AC120V) (AC220/240V) (AC110/120-127/220/ 240V)	PTT1026	PTT1026	 PTT1027	 PTT1027	 PTT1028	 PTT1028	

Schematic Diagram of HEM and HB types



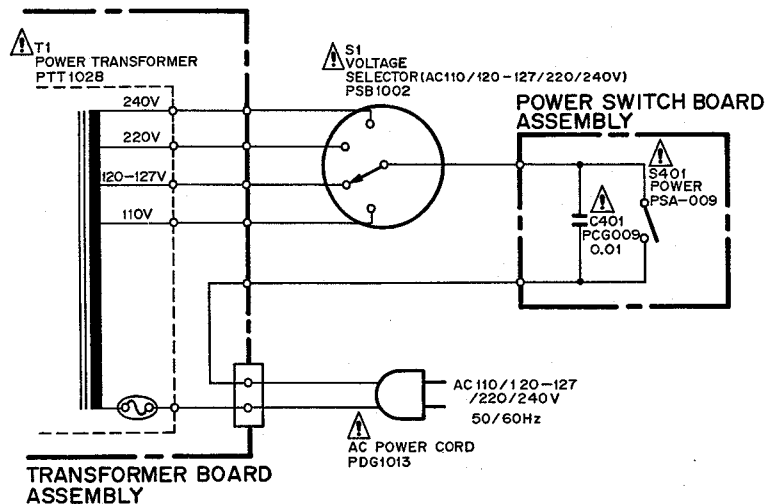
Line Voltage Selection (For HEM and HB types)

Line voltage can be changed with following steps.

1. Disconnect the AC Power cord.
2. Remove the Bonnet case.
3. Change the connection of the primary lead wires.
(Connect as shown in Fig.)
4. Stick the line voltage label on the rear panel.

Description	Part No.
220V label	AAX-193
240V label	AAX-192

Schematic Diagram of SD type



[illegible]

MAIN BOARD ASSEMBLY (PWZ 1073 and PWZ 1235)

The main board assemblies (PWZ1073) and (PWZ1235) are the same as the main board assembly (PWZ1159) with the exception of the following sections.

Mark	Symbol & Description	Part No.			Remarks
		PWZ1159	PWZ1073	PWZ1235	
★★	IC3	CXD1135QZ	CXD1130QZ	CXD1130QZ	
★★	IC5	PCM56P-J	PCM56P	PCM56P	
★★	IC13	NJM78L12A	.....	.....	
★★	IC14	NJM79L12A	.....	.....	
★★	IC20	NJM78L05A	.....	.....	
★★	IC21	NJM79L05A	.....	.....	
★★	IC25, IC26	M5238PF	μPC4572C	μPC4572C	
★	D5—D8	S5688B	.....	.....	
★	D17—D19	.....	1SS254	1SS254	
	DL1, DL2	PTF1009	.....	.....	
	L2, L3	LAU010K	.....	.....	
	L4, L6	.....	LAU101K	LAU101K	
	C65, C66	CQSA331J50	CQSA271J50	CQSA271J50	
	C104, C105	CEAS102M25	.....	.....	
	C67, C68	CFTX683J50	CQMA683J50	CQMA683J50	
	C91	.....	CKCYF103Z50	CKCYF103Z50	
	C106, C107	CEAS471M25	.....	.....	
	C111, C112	CEAS471M16	.....	.....	
	C144, C147	CFTXA103J50	CQMA103K50	CQMA103K50	
	R3, R5, R97, R98, R104, R110, R131, R132	RD1/6M□□□J	.....	.....	
	R4, R6	RD1/6PM562J	RD1/6PM123J	RD1/6PM123J	
	R76	RD1/6PM302J	RD1/6PM332J	RD1/6PM123J	
	R77, R78	RD1/6PM302J	RD1/6PM392J	RD1/6PM392J	
	R100, R106	RD1/6PM123J	RD1/6PM163J	RD1/6PM163J	
	R103, R109	RD1/6PM511J	RD1/6PM102J	RD1/6PM102J	
	R117	RD1/6PM224J	RD1/6PM274J	RD1/6PM274J	
	JA1 2P pin-jack	VKB-006	PKB1003	PKB1003	
	JA2, JA3 3.5φ mini-jack	.....	RKN-071	RKN-071	

CONTROL BOARD ASSEMBLY (PWZ 1074 and PWZ 1236)

The control board assemblies (PWZ1074) and (PWZ1236) are the same as the control board assembly (PWZ1160) with the exception of the following section.

Mark	Symbol & Description	Part No.			Remarks
		PWZ1160	PWZ1074	PWZ1236	
	Remoto control receiver L201, L202	BX-1387 LAN010K	..... .....	..... .....	

TRANSFORMER BOARD ASSEMBLY

The Transformer board assembly (for PD-M40/KU, KC, HEM, HP, SD and PD-M40-S/HEM types) are the same as the Transformer board assembly (for PD-M50/KU type) with the exception of the following sections.

Mark	Symbol & Description	Part No.						
		PD-M50 /KU	PD-M40 /KU	PD-M40 /KC	PD-M40 /HEM	PD-M40 /HP	PD-M40 /SD	PD-M40 -S/HEM
⚠ ★	T1 Power transformer (AC120V)	PTT1026	PTT1022	PTT1022	.....	.....	.....	.....
	(AC220/240V)	.....	.....	.....	PTT1023	PTT1023	.....	PTT1023
	(AC110/120-127/220/ 240V)	.....	.....	.....	.....	.....	PTT1024	.....
	C308—C310	CKCYF103Z50	.....	.....	.....	.....	.....	.....

Schematic Diagram of SD type

